

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Weekly Newspaper — Second-class postage paid at Chicago, Illinois

Vol. VI No. 15

April 12, 1972

Price: \$9/year



Calif. Assembly OKs Software Exemption

SACRAMENTO, Calif. — The California Assembly has passed by a vote of 71 to 1 a bill that would give users and vendors a two-year reprieve from taxes on software so that further studies can be made on the problem of assessing the taxes.

The measure will now be sent to the Senate Revenue and Taxation Committee for hearings.

Capitol sources said no major opposition is anticipated, but Senate action is not likely before the end of April.

If the proposal becomes law, it would abort plans by county assessors to put software on the tax rolls by assessing it as tangible personal property.

The bill states that computer software would be assessed as if there were no program on it. Software sold with a computer, however, would be valued as a unit with the computer.

WU Plans 30% Rate Cuts, FCC Approves Datran Sites

Western Union has told the FCC it plans to lower its rates "as much as 30%" for medium-speed data channels between Chicago and St. Louis. The proposed rates would go into effect June 5 if approved by the FCC, and "would match without undercutting" present Microwave Communications Inc. rates, WU said.

In a related move, Datran became the second specialized carrier to get construction approval from the FCC, when 63 tower applications between Palo Alto, Calif., and Houston were voted last week. Construction will begin "during the last half of 1972" with initial service "in late 1973," Datran said.

On the Inside This Week

Extended Memory Judgment Tests
IBM's Technical Competence

— Page 6

Special Report: Independents
Set to Replace 1403 Printer

— Page 8

Cobol Interpreter Available
For System 3/10 Users

— Page 13

Communications	17
Computer Industry	29
Editorial	10
Education	23
Financial	34
Societies	21
Software/Services	13
Systems/Peripherals	19

TCC's Extended DOS Enhancements Include 6 Partitions, Load Balancing

By Don Leavitt
Of the CW Staff

RICHMOND, Va. — The Computer Company (TCC) has released the first version of its Extended Disk Operating System (Edos) which adds a range of features, including control of six separate partitions, to IBM's DOS Release 26.

The Edos enhancements include supervisor, system and utility support. Although several features, such as the six-partition support, aid more effective multiprogramming, many are just as valuable to the smaller user who wants more efficient operations, the company said.

TCC spokesmen also stressed that Edos is an extension of the IBM stabilized DOS Release 26, so that it gives the system enhancements to the 360 user who may not want to move up to the 370, as well as to the user who has already moved to the newer hardware.

Core Costly

While support for six partitions is the most spectacular feature of Edos, it is also the most costly in terms of core, requiring a minimum of 128K bytes of memory "before it should even be considered," TCC said. For that reason, it is an extra-cost feature, rather than a part of the basic Edos.

Essentially, Edos provides a new supervisor without altering language processors, access methods or other elements of the operating system.

The Edos supervisor provides load balancing, storage of programs and loaders in relocatable form and blocked fetching of program phases. Better management of resident and transient DOS modules cuts sharply into the inter-job processing time, the company noted.

System enhancements include automatic volume recognition of disk packs, a procedure library for JCL storage and a link editor said to be two to four times

faster than IBM's. A report module is available for the job accounting records generated by DOS.

A disk dump/restore subsystem, said to be able to transfer contents of an entire 2314 disk pack to tape in less than four minutes, is the chief utility provided by Edos. Otherwise, there is a system for both temporary and more permanent source statement library and a text-editing routine, intended for in-house production of user manuals.

While several of these DOS enhancements are available individually or in small combinations in software from other vendors, this is the first time so many have been combined in a single package, TCC claimed.

In addition, any DOS enhancements not in Edos, but which can operate under IBM's DOS Release 26, can still be used with the Edos supervisor. Spooling of slow I/O and the ability to assign phantom peripherals when there are not

enough real ones are examples of capabilities now outside of, but compatible with Edos, spokesmen said.

Twin Machines

The six-partition support feature, from an operator's viewpoint, turns the 360 or 370 into twin DOS-oriented machines, each with three partitions. Jobs are still assigned to background, foreground 1 and foreground 2, but references are in upper case for one of the "machines" and in lower case for the other.

All six partitions can be controlled through one Sysres pack, or through two. With the two Sysres options, the Edos user could maintain separate versions of the system, or could do system work on one pack while continuing production work with the remaining three partitions, TCC said.

The Edos features are modular and are included or left out, based on parameters
(Continued on Page 2)

STC Double Density Drive Uses Standard Mag Tape

By Frank Piasta
Of the CW Staff

LOUISVILLE, Colo. — Storage Technology Corp. (STC) has introduced a series of magnetic tape systems, compatible with IBM computer systems, that can read and write standard magnetic tape at a recording density of 3,200 bit/in.

Twice the density offered by any other company, the 3,200 bit/in. density can be achieved, the company said, with most of the currently manufactured tapes that use a heavy duty binder. Older tapes, especially those made before 1964, might not

be suitable, the company said.

The new density is offered by STC in the 3500/3800 Magnetic Tape subsystem. The 3500 drive is basically the same unit as preceding versions and may be field upgraded to 3,200 bit/in. capability.

The tape-to-head relationship had to be strictly controlled through a redesigned head contour and a sharper write-pulse definition. The read operation uses phase-encoded read detection with redesigned circuitry.

Fewer Tape Reels

The greatest benefits with the high density will be to the user with massive tape files who can decrease the number of tape reels in his library. Throughput time on a given job could also be improved by the elimination of tape-swapping time.

The average user will save money on his rental, the company said, by going to a lower tape speed, higher density drive to get the same data rate at a lower monthly cost.

The 3500 drive, STC said, approaches the limits of technology as far as currently available media are concerned. Any further advance in recording density, the company said, will probably have to be accompanied by changes in the media and/or basic recording techniques.

Monthly lease prices on the 3500 drives will range from \$510/mo to \$840/mo for models with tape speeds from 75 in./sec to 250 in./sec and data rates as high as 800,000 byte/sec. The 3800 controller, a modified version of the Mark III Model used with other 250 in./sec STC drives, carries a monthly lease price of \$840/mo.

First deliveries will be during the first quarter of 1973 from 2270 South 88th St., 80027.

2314 'Universal' Controller Offers More, Costs Less

By a CW Staff Writer

SANTA ANA, Calif. — International Peripherals & Computer Corp. (IPC) has developed a "Universal" Controller that could mean big savings for IBM 360 and 370 users.

In its first version, the controller is a direct compatible replacement for the 2314 control unit. The price of the IPC unit is 20% of that of the IBM device, a savings of about 80%.

Writable Control Store

The controller includes a writable control store that will allow users to add rotational position sensing and multiple requesting, usually reserved for the 3330. The company cautioned that the user would have to modify the IBM-supplied operating system software to implement these features.

The disk controller display indicates file selected, cylinder and head address of selected file (CCHH), current channel command word (CCW), bit count appendage and specific address of control unit and file which wrote the record, and file status.

The "Universal" Controller can be modified to duplicate any IBM controller used with the 360 or 370, the company said. This could include controllers for tape drives, terminal line printers and combinations of devices.

The unit can also perform functions of such units as the 2860 selector channel, 2870 multiplexer channel and the 2880 block multiplexer channel.

First deliveries are being made this month. The special 2314 features will be available in six months from 633 Young St., 92705.

City Bonds May Buy Computer

By E. Drake Lundell Jr.
Of the CW Staff

CLEVELAND — This city may become the first in the nation to issue municipal bonds specifically for computer equipment in an economy move to replace what has been called an "inefficient" data processing operation. Mayor Ralph J. Perk has intro-

duced legislation into the city council for a \$2.5 million bond issue to allow the city to purchase an IBM 370/155 instead of renting the machine from IBM at \$758,000 per year.

The use of a bond issue for computer equipment is probably a "first," an IBM spokesman said.

The 370/155 will replace two 360/40s presently operating "inefficiently," according to two recent reports to the city.

Overall, the new system will give the city "increased flexibility" and purchasing the machine outright will save the city about \$2.5 million over the next few years, city sources said.

Operating the system more efficiently will also save money with better fiscal control, better inventory control and more efficient operation in other areas, they said.

A recent report, conducted by the accounting firm of Peat, Marwick, Mitchell & Co., found that one of the present 360/40s was not operating 67.9% of the time and that the other machine was not in use 25.5% of the time.

Between January and October last year, the firm said one 40 was used only 6,013 hours out of a possible 18,720, while the other was used 10,742 hours out of 14,400.

"The systems were definitely underutilized," according to Mitchell Sahadi, vice president of Logics Corp., now working on a City Task Force, funded by the Greater Cleveland Growth Association, to help the city's overall operations.

Even though the city had modern equipment, the applications "smacked of the old unit record applications."

The city also lacks a sound accounting system for the payment of bills, he said.

"The city has never had good fiscal control. Instantaneous accounting by computer will allow Cleveland to take advantage of discounts allowed by companies when bills are paid within a specified time," he added.

Small Systems Covered

MOORESTOWN, N.J. — All About Small Accounting Computers, a management-oriented report covering 58 low-priced business data processing systems, is available from Datapro Research Corp. for \$10 per copy.

The 24-page report, designed to aid executives in understanding small computer systems, has been reprinted from the February supplement to *Datapro* 70.

News Wrapup

Class Suit Vetoed on Credit Cards

NEW YORK — A federal judge ruled here that a suit charging Chemical Bank with failure to disclose finance charges on monthly computerized statements of its Master Charge credit card did not qualify as a class action.

This means that each of more than 130,000 individual card holders must sue separately to receive damages of \$100 that the judge said last June they were entitled to get.

Chemical said in its defense that its lawyers had not believed the disclosure was required in cases where no charge had been made.

County DP May Yield Additional Income

FORT COLLINS, Colo. — A new computer system in Larimer County is expected to generate additional income for the county.

The municipalities of Fort Collins and Estes Park are already making use of computer services by county equipment. And other nearby municipalities which do not have computers are potential customers of the county DP arrangement.

Colorado's uniform audit system for county accounting is expected to bring all county business procedures into conformity with procedures used in Larimer County.

Canada Takes a Look at Computers, Privacy

TORONTO — One of the primary objectives of the Federal Government's Computer Communications Task Force will be the investigation of computers and their effect on individual privacy.

The task force will present its findings this month, following public discussions. The report will include specific recommendations, such as who should head the computer communications network and who — government or industry — should implement the recommended policies.

Sign of the Times: Computer-Read EKGs

NEW YORK — Within five years, 90% of the nation's hospitals will use a computer to diagnose heart ailments, according to a noted cardiologist.

Dr. Leon Pordy of The Mount Sinai Medical Center said that use of the computer in reading and analyzing electrocardiograms was inevitable. "The computer is generally more accurate than the human eye, provides hospitals with instant, low-cost service and functions without fatigue 24 hours a day, seven days a week."

Pordy was influential in the development of the world's first computer system which diagnoses an electrocardiogram.

\$1,000 Computer Science Grant Awarded

ANAHEIM, Calif. — George A. Boyer has received West Coast University's new \$1,000 William Duke Annual scholarship grant in computer science, established by Computing & Software, Inc.

An employee of Hughes Aircraft Co., Boyer, 35, achieved a 3.99 grade point average over his five years of evening classes at West Coast University's Orange County Center in Orange.

The award encourages outstanding students in computer science and honors Dr. William M. Duke, a trustee of the university, for his many contributions to science and industry.

Navy DPer Gets a Free Change of Scenery

NEW YORK — Glen Voges, a programmer/analyst at the Navy Resale System Office in Brooklyn, N.Y., has won a free trip to Rome, courtesy of Genesis One Computer Corp., sponsor of the contest.

As a civil service employee, Voges has been a computer programmer with the U.S. Navy Department for the past four years. He is married and he and his wife plan to take their week in Rome in the very near future.



Fluid Ordering

The receipt for raw milk picked up by Lehi The Farmer's Dairy appears to get some bovine supervision on a farm in Pennsylvania. The hand-printed order forms are OCR-read directly into an IBM 370/145 to eliminate delays and errors usually associated with order preparation.

Enhancements Include 6 Partitions

(Continued from Page 1)

used with one extra macro at Sysgen time. All the basic features can be included in less than 2K bytes of core. The six-partition support adds another 2K bytes of memory to the supervisor, according to the company.

14K-byte Minimum

Batched partitions under Edos also must be a minimum of 14K bytes, rather than the 10K bytes

required by IBM. Single Program Initiate (SPI) partitions are no different under Edos than under DOS, spokesmen added.

The basic Edos is available for \$225/mo on a lease arrangement, while the six-partition feature, which requires the basic system, leases for an additional \$75/mo. One-time purchase prices are 30 times the monthly lease prices, TCC said from the Seventh and Franklin Building, 23219.

ATTACH LABEL HERE for address change or inquiry. The code line on top may not mean much to you, but it is the only way we have of quickly identifying your records. If you are receiving duplicate copies, please send both labels. Please let us know four weeks before you plan to move. List new address below and include a current mailing label or your old address.

☐ 1 year — \$9*

*10 a year in Canada; Airmail to Western Europe and Japan, \$15 a year; Other foreign rates on request.

CHECK HERE TO ENTER YOUR SUBSCRIPTION

☐ Charge My American Express Account:

☐ Payment enclosed

☐ Bill me

☐ New subscription

☐ Change of address

If charge we must have cardholder's signature:

PLEASE CIRCLE 1 NUMBER IN EACH CATEGORY

YOUR INDUSTRY

- 01 Mining/Construction/Oil & Refin.
- 02 Manufacturing — Computer or data system hardware/peripherals/other associated mechanical devices
- 03 Manufacturing (other)
- 04 Utilities/Comm Sys/Transport
- 05 Wholesale/Retail
- 06 Finance/Insurance/Real Estate
- 07 DP Serv. Bureaus/Software/Plann.
- 08 Business Services (except DP)
- 09 Education/Medical/Legal
- 10 Federal, State and Local Govt.
- 12 Communications/Printing/Publ.
- 13 Other:

YOUR FUNCTION

- 01 Corporate Officer
- 02 Data Processing & other Operational Mgmt
- 03 Data Processing Professional Staff
- 04 Consultant
- 05 Lawyer/Accountant
- 06 Engineering/Management/Scientific/R&D
- 07 Sales/Marketing/Account Exec.
- 08 Librarian/Educator/Student
- 09 Other:

First Initial	Middle Initial	Surname
Your Title		
Company Name		
Send to: Address		
City	State	Zip Code

Address shown is: ☐ Business ☐ Home ☐ Check here if you do not want to receive promotional mail from *Computerworld*.

COMPUTERWORLD Circulation Department
797 Washington St., Newton, Mass. 02160

Run by Students**Tax Assistance Program Going Strong**

CHARLOTTESVILLE, Va. — A free computerized tax counseling service offered by University of Virginia graduate students for lower income families of the Charlottesville area is in its second year of operation.

Operating on weekends with some 250 students from the Graduate School of Business as counselors, the tax preparation service was used by more than 600 area taxpayers this year.

The Internal Revenue Service provided instruction booklets for all student volunteers (distributed several days before the instruction period), all applicable tax tables, schedules and preaddressed envelopes.

The service utilizes donated GE Terminate 300 teleprinters and computer time.

A student at the business school developed a computer program that would calculate standard federal and state returns when input of readily available data was given. Involved returns were done by hand.

Those taking advantage of the program were mostly low income (average about \$5,000) families with relatively simple returns. The next largest single group was students who had worked during the summer or part time, had had taxes withheld and were entitled to a full refund.

The idea has spread to a number of other campuses around the country and a similar program is now in use in four other states at state and privately operated colleges.

Project Determines Most Patients Like To 'Tell the Computer'

By Robert L. Glass

Special to Computerworld

SEATTLE — Published results of a one-year test program show both doctors and patients are generally pleased by the experimental use of computers to record patients' medical histories.

An overwhelming number of patients (96%) felt comfortable answering the computer-presented questions. Many felt more at ease responding to a computer (39%) than to a doctor (24%), and 37% saw no difference at all.

Doctors were pleased with the results — 72% found it helpful and 77% found it saved them time. However, 40% of the doctors wanted more or different information and 34% did not.

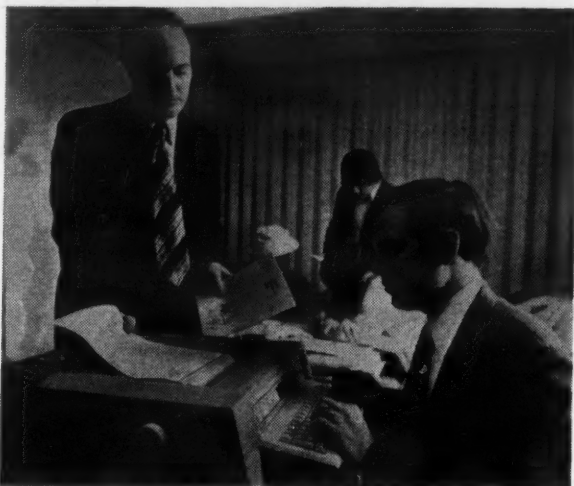
The test program, one of the first to use remote terminals for history acquisition, was conducted by the Medical Computer Services Association (MCSA), a non-profit corporation linked to the federally funded Washington/Alaska Regional Medical Program.

MCSA leased the system, a Profile 320, manufactured by Searle Medidata Inc. for one year, and found a charge of \$5/patient history allowed it to break even on the \$30,000 total expenses.

A PDP-8 computer was located at the Washington State Medical Association office, and five remote terminals were placed in various offices, hospitals and clinics in the greater Seattle area.

Patients answered multiple-choice questions about their health histories for an average of 30 minutes. A summary was available from the computer in about seven minutes.

Some problems encountered were predictable — teletypewriters are noisy; MCSA preparation of participating doctors was inadequate; and "ingrained tradition" caused some doctors to reject the new concept. Others were surprising — doctors tended to send patients they didn't like to the computer, the system was not suitable in a crisis environment and difficult to use at bedside.



University of Virginia graduate school students Frederick Harvey (standing) and Tee Williams work on a tax form.

**THE COMPUTER INDUSTRY:
NEW DIRECTIONS IN THE 70's**

Full Day Seminar With Market Forecasts for

- Computer Mainframe Shipments
- Independent Peripherals
- Minicomputers
- Computer Services & Timesharing
- Computer Leasing
- Software & Supplies
- International EDP Markets

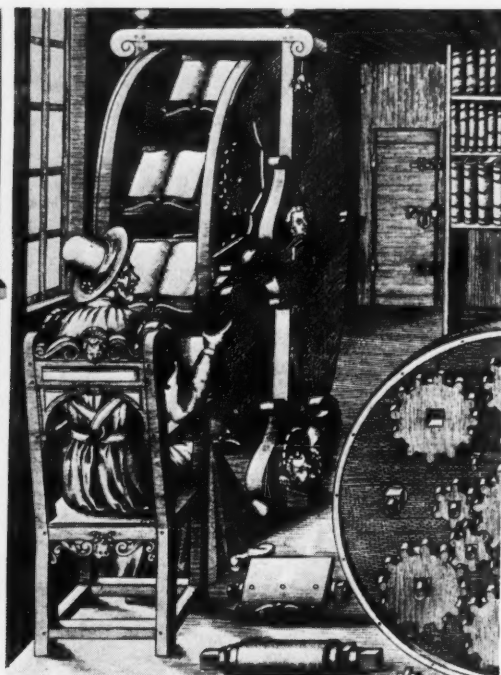
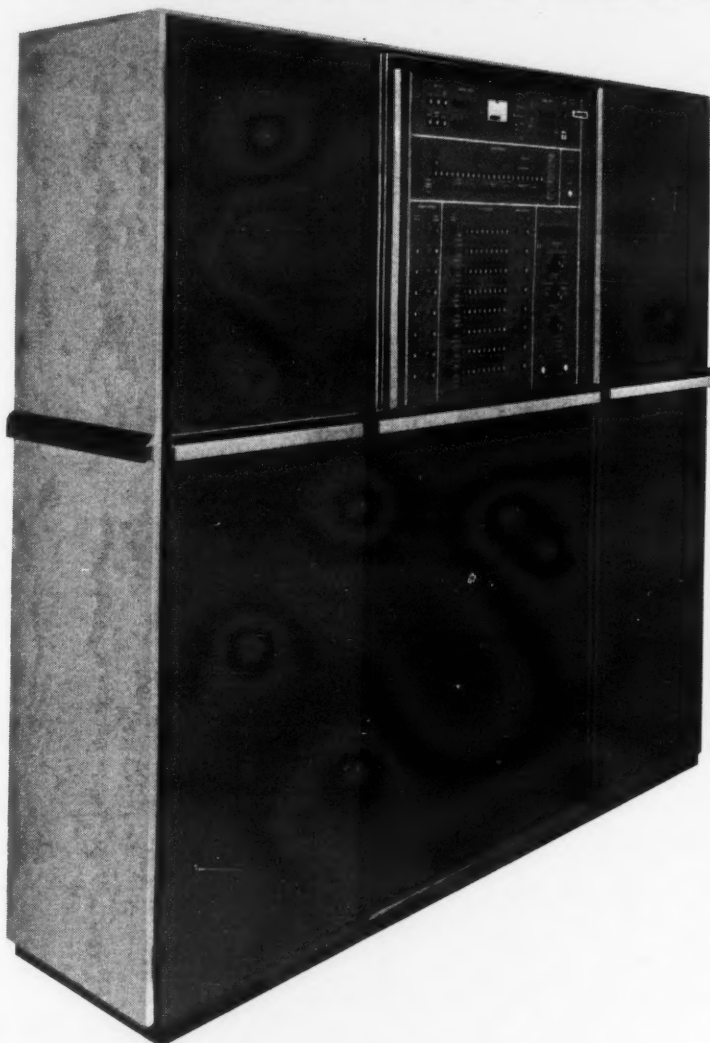
Participants receive a detailed, 60-page book of industry forecasts, market shares, trends.

For information contact Seminar Coordinator
(617) 969-4020

IDC INTERNATIONAL DATA CORPORATION
60 Austin Street, Newton, Mass. 02160

The leading market research firm for the computer industry

May 11, 1972 New York City \$195
Americana Hotel

**Get your 360 to work harder.
Enhance its memory power.**

**Before you think about a 370,
think about Ampex memory enhancement.**

More memory means more resident programs, simpler programs, larger buffer allocations, increased efficiency . . . and even new computer applications.

And Ampex ARM Mainframe and ECM Extended Core Memories can make an IBM 360 outperform a 370. ARM doubles or triples mainframe memory; ECM adds core in 1 megabyte increments at high speeds.

Memory to get more out of your computer. Use ARM to double or triple your memory capacity, get more done with your present computer. For example, ARM-22 can expand the 360/22 to 64K; ARM-30 can expand the 360/30 to 128K, and ARM-40 can expand the 360/40 to 512K. The ARM-50 works to one and one half million bytes. Economical, too, on purchase or lease.

ECM provides 1.8 usec cycle time for IBM Models 65, 67 and 75, even faster with interleaving. ECM for Model 50 operates at 2.5 usec. Available in 1 to 8 million bytes to expand memory with no software changes.

Worldwide service, too. For information on ARM, ECM, as well as tape drives and disk drives . . . call your local Ampex computer expert. Or write.

AMPEX

AMPEX COMPUTER PRODUCTS DIVISION
13031 West Jefferson Boulevard
Marina del Rey, CA 90291. (213) 821-8933

At the CW Southern Calif. Caravan...

Stress On-Line File Recovery, Users Told

LOS ANGELES — Intelligent CRT terminals, with cassettes for data input and output and hard-copy printing capability, solve many problems in inventory control that aren't solved by paper tape processing, on-line

direct-entry or key-tape operations, according to John Johnston of the Farr Co.

The CRT units allow the data to be entered virtually as quickly as with direct-entry or conventional key-tape operations, and

support hard copy printing of sales, purchase and manufacturing orders generated overnight at a separate data center, Johnston told his intelligent terminal workshop at the Southern California Computer Users' Forum

last week.

By putting data on cassettes and then transcribing it to half-inch tape for physical transportation, once a day, to the data

Data Entry

center, Farr also could shift its processing to another center if needed.

Software and recovery procedures increase in importance with computer users' hardware sophistication, attendees at the forum were reminded.

"We know we're going to have down conditions, that's not the question," said panelist Bruce Armstrong, project leader for the Walt Disney Productions' hotel computer system.

"The question is how much downtime" will be incurred, he

...To San Francisco

The conference visits San Francisco this week (April 10-12) and Chicago next week (April 18-20).

said, in emphasizing the need to plan for on-line file recovery.

If the Disney system is down when a guest checks out of a hotel, a bill can still be prepared, and late charges are mailed to the customer, Armstrong said. If just a terminal or a portion of the system goes down briefly, there is immediate file backup created by referring to the original transaction, he added.

Charles Nolan of the U.S. Navy Aviation DP Service Center told his panel on optical character recognition that OCR can solve most data entry problems, if the user has a current workload of at



(CW Photos by E.J. Bride)

The new Novar 7-70 data collection unit, shown only in Los Angeles, gets a "hands-on" workout.

least 300,000 card/mo.

Data has to be typed in OCR-A for the scanner, Nolan admitted, but this type font can be provided on a Selectric typewriter "ball," and when the OCR work is done, the ball can be replaced and the typewriter used for standard office correspondence.

Nolan's installation was able to replace 14 keypunch operators and 14 verifiers with 14 typists, a direct labor cost savings. The typewriters could also be located wherever the user departments wanted, for ease of entry. They didn't have to be grouped in a central office, which often proved equally inaccessible to all, he noted.

OCR input might be preferable to keypunch replacement, "if you can get somebody else to do your typing for you," commented Peter Mills in his keypunch replacement workshop.

Mills, associate Medicare administrator for Occidental Life of California, said using a shared-processor key-to-disk system saves his company \$1,000/mo in cards, plus a 30% reduction in keypunch personnel. Throughput increased by 49%, he said, measured in terms of record/man-hour.

...Independents Are 'the Way to Go'

LOS ANGELES — Los Angeles County has found that dial-up communications lines are perfectly adequate for most applications, and that in some cases in which the county is using leased lines, there is absolutely no need for special conditioning, according to panelist Les Walker, communications supervisor for the county.

The four-year-old centralized DP department found, however, that substituting Penril modems for those from the Bell system increased throughput as much as 62% in some instances. This improvement is made, Walker told the dial-up workshop, because the units from the independent do not include the built-in time delays for echo suppression and other "handshaking" duties in the Bell modems.

Even with leased lines, on the other hand, the California State Universities and Colleges data network, linking 19 institutions,

can't handle big batch and interactive problem-solving tasks currently. Consequently, big jobs are often sent to the appropriate data center by air or surface transportation, John Harrison of the network told his workshop on leased line utilization.

The network, developed within the past four years, is designed to allow job types to be entered indiscriminately. The system sorts them out sending them to either time-sharing or batch-

Communications

oriented CPUs for processing, and returns data to the sending terminal.

The colleges pay some \$70,000/yr for communications lines. In setting up the network they purchased their own modems and developed their own software protocols for servicing the users. Both of these strategies have been subjects for second thoughts, Harrison said. "In fact, all equipment will go out for bids again in 1974," he added.

As for the independents, "no doubt about it," they're "the way to go," according to Bruce Harris of Continental Airlines. While much of the hardware is currently IBM, "rarely" is any new communications equipment installed by the mainframe maker.

Data communications at Continental, or at the five other airlines which it serves, include Honeywell front-end concentrators, Collins modems, Inco-term CRTs and other equipment from Data Products and Data Measurement Corp. (multiplexers and teletypewriter terminal replacements, respectively).

Harris spent about six years as an IBM systems engineer, he told the attendees at his workshop on independent equipment suppliers and mainframe makers. While outside vendors can often

provide equipment at 50% to 75% of IBM prices, equipment consideration must extend to maintenance, he admitted.

"When you look at a CRT that does the same as IBM's at half the price, it's hard not to go independent," he related.

In explaining the "conservative approach" in obtaining communications gear, panelist Frank Oliver, staff engineer at Hughes Aircraft, told attendees at his workshop on carriers as equipment sources that the Hughes network is a "dynamic" one that changes frequently. If his company decides to change the makeup of a remote site, or perhaps close the site, the inflexibility of minimum-time commitments with independent suppliers could be costly.

Most independent suppliers require a minimum one-year commitment, and "quite frequently, multi-year" contracts, Oliver noted.

For the same reason, if equipment is selected but not delivered for six months and a facility is closed, based on a two-month advance notice, then the decision to use independent vendors "could look bad," he added.

With the common carriers, a user can discontinue using modems "almost immediately," he said.

Too Many Vendors Can Be Problems

LOS ANGELES — The move to independent peripherals must be predicated on more than just budgetary considerations, according to Ross Penne of the University of Southern California (USC).

Without specifying vendors, he said two different suppliers of disks and tapes may not be as cost-effective as one independent vendor. The maintenance personnel of additional vendors can present some problems, just because of the number of employers, and not necessarily their

expertise, he indicated.

The USC center has independent tape drives with an IBM control unit, which is "not the way to do it," he told attendees at the operational efficiency workshop.

"Draw the line between the control unit and the main-

Operational Efficiency

frame," he noted, and not between the peripherals and the control unit.

For panelist Frank Rodstrom, manager of computer operations at Rohr Industries, a \$7,000 extended core unit performed better than the \$25,000 equivalent from IBM.

Regarding independent equipment, Rodstrom said his company had to spend thousands of dollars to prove multiplexer channel problems were caused, not by an independent vendor, but in the design of IBM equipment.

Lou Fried of Title Insurance told his Caravan workshop that the decision of whether to use dedicated or general-purpose

equipment for a given application is too often made on technical equipment evaluations, rather than broad management consideration.

The cost and availability of supplies to support any method of implementing an application must be considered. If multiple copies are needed, for example, carbon copies of line printer output may not be the answer. Printing onto multilith masters might solve the problem, however, if the user has a multilith machine available, Fried said.

Los Angeles County still has a wide mix of hardware — IBM, Burroughs, NCR, Honeywell and RCA — in seven separate data centers, but it has done several things to bring order out of this chaos, according to Lance Goodwin of the county's DP department.

As part of the centralization effort, for example, the department has established a Cobol subset that can be used across equipment lines, he told the software workshop.

Features available in any given compiler, but not set forth in the common subset, may not be used without managerial approval, Goodwin noted.

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
TM Reg. U.S. Pat. Off.

ROBERT M. PATTERSON, executive editor, V.J. FARMER, news editor, RONALD A. FRANK, technical news editor, E. DRAKE LUNDELL JR., computer industry editor, DONALD LEAVITT, software editor, EDWARD BRIDE, JUDITH KRAMER, FRANK PIASTA, MARY UPTON, staff writers, MARVIN ARONSON, LESLIE FLANAGAN, copy editors, PATRICIA M. GAUVREAU, editorial assistant.

J.H. BONNETT, European bureau.
NEAL WILDER, national sales manager; DOROTHY TRAVIS, sales administrator; FRANCES BLACKLER, market research.

LEETE DOTY, production manager; HENRY FLING, production supervisor.

EDITORIAL OFFICES: 797 Washington St., Newton, Mass. 02160 (617-332-5606; TWX 710-335-6636). Europe: Computerworld, c/o IDC Europa Ltd., 59 Grays Inn Rd., London, W.C.1, England (01-242-8908).

Second-class postage paid at Chicago, Ill. Published weekly (except: a single combined issue for the last week in December and first week in January) by Computerworld, Inc., 25 E. Chestnut St., Chicago, Ill. 60611. © 1972 by Computerworld, Inc.

Reproduction of material appearing in Computerworld is strictly forbidden without written permission. Send all requests to publication manager.

25 cents a copy; \$9 a year in U.S.; \$10 a year in Canada; Airmail to Western Europe and Japan, \$15 a year. Other foreign rates on request. MARGARET PHELAN, circulation manager. Four weeks' notice required for change of address. Address all subscription correspondence to circulation manager, Computerworld, 797 Washington St., Newton, Mass. 02160.

W. WALTER BOYD, publication manager, PATRICK J. MCGOVERN, publisher.

BPA


IP

AIA

POSTMASTER: Send Form 3579 (Change of Address) to Computerworld Circulation Dept., 797 Washington St., Newton, Mass. 02160.



Sanders 804 intelligent terminal gets close attention.



Price/Performance Leadership is that special combination of engineering excellence, manufacturing capability and applications knowledge that produces precisely the right product at the very lowest price—to give *you* the most for your money. Sound purchase decisions must be based on an evaluation of Price/Performance. In CRT terminal systems, The Hazeltine 2000 System is the acknowledged Price/Performance leader in its class. That's why, in less than two years, The Hazeltine 2000 System has become the accepted System, the proven System, showing the way to cost-cutting applications in Business, Finance, Government, Hospitals & Universities.

Ask for a demonstration.

No. 1 in Price/ Performance.

Hazeltine Corporation

Computer Peripheral Equipment Greenlawn, N.Y. 11740 (516) 549-8800

EAST: NEW YORK (212) 586-1970 ☐ BOSTON (617) 588-8700 ☐ PHILADELPHIA (215) 676-4348

MIDWEST: MINNEAPOLIS (612) 854-6555 ☐ CHICAGO (312) 986-1414 ☐ CLEVELAND (216) 752-1030

DETROIT (313) 355-3510 ☐ ST. LOUIS (314) 862-7261

SOUTH: DALLAS (214) 233-7776 ☐ ATLANTA (404) 458-9360 ☐ HOUSTON (713) 622-0551 ☐ WASHINGTON, D.C. (703) 979-5500

WEST: SAN FRANCISCO (415) 398-0686 ☐ DENVER (303) 388-8844 ☐ LOS ANGELES (213) 479-6800

3d Compromise Tests IBM's Technical Competence

By Alan Taylor

The technical competence of the IBM engineers, as well as their professional honesty, was unexpectedly placed on trial at

the conclusion of the add-on memory case. After IBM had insisted it would be "impractical" to attempt to maintain, even at a reduced maintenance

level, the altered equipment, the IBM engineering force was under instructions to do just that!

The new position was not a particularly happy one. On the

one hand, IBM could find that in fact it was unable to maintain the equipment — and so raise very serious doubts about its technical competence, or it could successfully keep the equipment on the air, and so

legally "impractical," and instead accepted the IBM engineering policy.

As a result, when the crunch came in March, it turned out that IBM had not obtained approval of the courts for its chosen method of implementing any maintenance withdrawal, and it also had not even bothered to discuss the definition of the word "impractical" with users or with the Justice Department for at least five years!

It turned out that IBM engineers, who were trained to consult with other engineers (and so knew it was practical to do so), accepted a policy that they should not consult with outsiders.

Their reward was to find themselves suddenly on the horns of a dilemma. They now face condemnation for technical dishonesty if they succeed in maintaining the equipment, or else incompetence if they actually fail to maintain it.

The IBM engineers, however, were not the only ones who were unhappy. The IBM users had discovered that, when they failed to enforce their own rights under the contracts, there was no guardian angel waiting to battle for them. They had seen that although the consent decree guaranteed they could alter and add to their equipment, neither the court that had granted the decree, nor the Justice Department which had agreed to it, had bothered to even define what the conditions really meant.

Users had seen their rights under contracts could be ignored, and that test cases taken suddenly, in obscure areas, after months of apparent acquiescence, could cause major disturbances.

And they had seen themselves again ignored as their rights were partitioned, in the words of Judge Lloyd H. Burke, as he approved the settlement between IBM and Advanced Memory Systems: "If the judgment is acceptable to the parties, it certainly shouldn't be any concern to the court." IBM users, of course, were not parties in the case.

The IBM users, then, like the IBM engineers, came out of the episode with fewer rights than when they went in. Hopefully, both users and engineers came out with a clearer view that they have only themselves to blame for their position.

Perhaps that is progress. But until the curtain rises on some future drama, the situation remains bad for IBM users, IBM employees and for the whole U.S. computer industry which IBM dominates.

CW Report

This is the fourth in a series of investigative reports on the effects of IBM's attempt to withdraw maintenance from 360/30 users with memories extended to 128K.

show that its original claims about "impracticality" had been false!

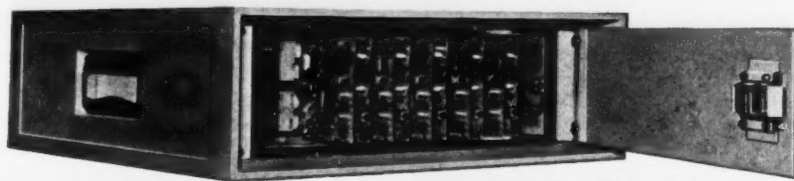
IBM's dilemma arose only when a third IBM solution to the problem was offered last month. Either of the two earlier suggestions would not have posed the question quite so sharply. The December offer — that IBM could maintain systems provided that add-on manufacturers restrict themselves to areas IBM approved — posed no such dilemma for the engineers, nor did the February offer of support, provided that the add-on manufacturer restrict himself to adding new circuitry, and avoid altering or using any of the IBM circuitry.

But the March compromise, and the one which has just brought the curtain down on the add-on memory act in the great maintenance debate, involved giving the users a reduced level of maintenance which they had previously been refused — and there is the rub.

While the IBM engineering dilemma was brought quickly into focus by this third solution, it actually had existed for many years. IBM engineers, being professionals, had had to read, and sign that they had read, the IBM Business Conduct Guidelines, which include the full 1956 consent decree. They had known for years that in the decree IBM had legally agreed to maintain altered equipment provided that it was not impractical.

The IBM engineers had refrained from demanding authoritative statements as to what was

frequency division multiplexer



(FIVE CHANNEL VERSION SHOWN)

FEATURES...

MULTI DROP: Drop one or more channels at a number of locations.

MULTIPLE ACCESS: Multi drop channels have equal opportunity contention for processor channels.

BUSY-OUT: Busy-Out control of remote data sets.

VOICE-PLUS-DATA: Simultaneous voice channel with four data channels.

LOOP-BACK: Test features provide rapid system diagnostics.

DATA RATES: Mix 110, 135, 150 and 300 baud channels.

CONTROLS: Processes all data set control functions.

OPTIONS: Many other optional features.

\$415

BASIC UNIT

\$305

PER CHANNEL END

\$3,880

TOTAL COST
5 CHANNEL SYSTEM
OR

\$140/MONTH

(3 Year Lease
With Purchase Option)

- SAVE 4-WAYS**
- 1 No high speed data sets required.
 - 2 No private line conditioning required.
 - 3 Modular construction permits starting with one channel and adding others as needed.
 - 4 Eliminate long distance phone calls with voice-plus-data.

Data Channel Concentrators and Expanders, Modems, Line Test Units and other Data Communication Equipment

COMDATA CORPORATION

7544 W. OAKTON ST. □ NILES, ILLINOIS 60648 □ 312/692-6107

Working with shady characters can cost you money.

Lear Siegler's new LSI 7700 is the only Interactive Display Terminal that eliminates costly mistakes from shady characters. Its 12-inch glare-free screen with large, easy-to-read characters avoids mistakes caused by misreading displayed input.

The 7700 is available in 1,000 or 2,000 character versions. Both are self-contained — equipped with keyboard, control and editing logic, character generator, refresh memory, interface and split screen.

The versatile 7700 offers a wide range of interfaces, which include EIA standard RS 232, parallel transfer rate up to 15,750 characters per second, and optional serial rates up to 120,000 bps.

For more information on how to avoid shady characters, write today to:

LEAR SIEGLER, INC.
714 No. Brookhurst Street
Anaheim, Calif. 92803
(714) 774-1010



DATA PREPARATION CONSULTING SERVICE

Improve your present or planned Data Preparation cost with an independent analysis of your requirements.

SPECIALIZING IN: Communications, Offline Data Conversion, Terminals, Key-to-Tape, Key-to-Disk, etc.

Vast expertise in complete systems planning and implementation.

NORTHEAST CONSULTING SERVICE
Mr. E. Coriveau P.O. Box 373
Wallingford, Conn. (203) 265-1223
Product Research for Manufacturers

Phony Phone Calls Get 'Wrong Number'

Special to Computerworld
SAN FRANCISCO — Pacific Telephone & Telegraph Co. hopes to save \$500 million a month with a computer programmed to stop credit card fraud in California.

The computer has thus far prevented completion of 80,000

bogus credit card calls since it began warning operators in January, according to Ben Dial, assistant vice-president for operations at Pacific Telephone & Telegraph Co.

Dial said the computer, in a secret location in California, is the only equipment of its kind

in the U.S. and is programmed to say "no" in a feminine voice when queried by an operator.

When a credit card call is placed, the operator keypunches the card number into the computer circuit. If the number checks out, the operator hears a recorded female voice say "okay." If the number is phony, the voice says "no," repeats the number and says "no" again.

The check takes 22 seconds.

The computer check is centered around Hollywood and the larger universities, where most of the phony calls occur, Dial said.

Movements of Oil Spills Studied, Method May Also Aid Enforcement

ROLLA, Mo. — A research team here is developing a computerized technique to predict oil spill movements in the open sea in order to give the U.S. Coast Guard time to deploy cleanup gear before the oil hits the beaches. Officials also hope to trace backward to determine what ship or ships spilled the oil.

Profs. Ronald Reisbig and Darryl Alofs of the University of Missouri-Rolla mechanical engineering department are in the second year of a long-range U.S. Coast Guard-sponsored research project involving the effects of waves and wind on oil spills.

Whither and Whence

"Knowing where a large oil slick is heading," Alofs said, "will give the Coast Guard time to deploy cleanup equipment. Knowing where it came from gives the Guard evidence to use in assessing fines and other penalties."

"We have taken actual data from previous ocean spills," Reisbig said, "and data from an experimental wave-analysis device we've constructed here. Both kinds of data were fed into an IBM 360/50 for evaluation which showed the assumptions of fluid mechanics made since the mid-19th century have erred on the low side."

Efforts now are aimed at developing a computer program to predict movement based on a few wind and wave measurements.

"With present cleanup technology," Alofs said, a "computer-prepared map listing coor-

dinates and times into the future would give Coast Guard officers lead-time enough to deploy the gear."

How to keep a thousand terminals talking over leased lines at least cost.

You need a data communications system from GTE Information Systems. At its heart will be a Tempo communications processor.

With the cost of dedicated lines today, one of these programmable beauties can save you a bundle.

It can poll your terminals, and listen for the dial-ins. Accept teleprinter and video data at any number of speeds and codes, all at once. And handle all these inputs and outputs, and send the data over high-speed trunks or local central processor channels.

With complete error control.

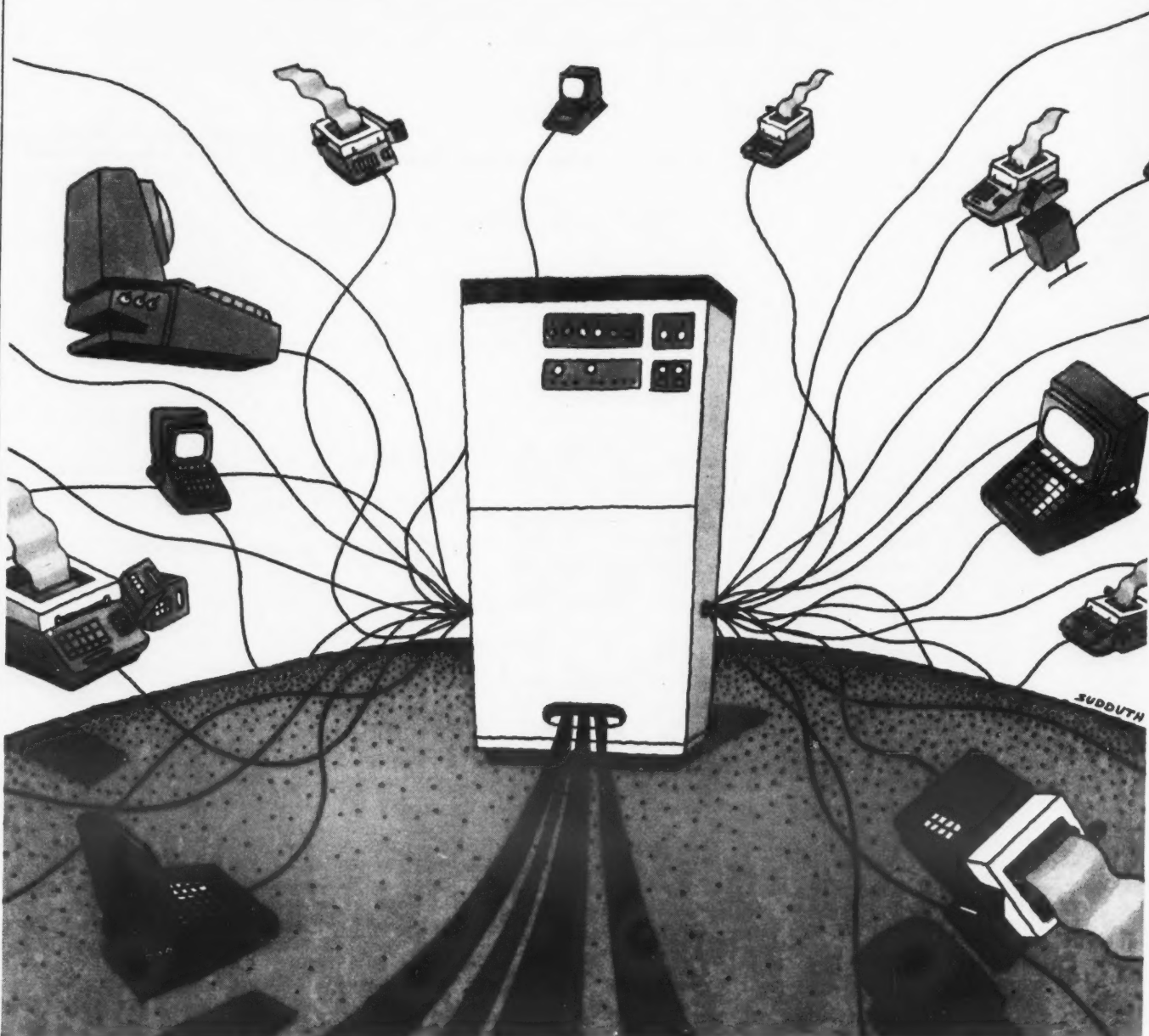
But there are several other possible custom configurations our very adaptable products can take. You ought to see our intelligent terminals and front end processors, for instance.

From terminal to central processor, GTE Information Systems' Tempo knows how to control your data communications.

And we've got the hardware, the software and the support services to give you exactly what you need.

To start with, call Gary Cadwallader at 714-523-9440. Or write GTE Information Systems, 4005 West Artesia Avenue, Fullerton, California 92633.

GTE INFORMATION SYSTEMS



OPTI-MAIL

Fast, low-cost way to cut COBOL job time!

OPTIMAIL is a unique, by-mail service of COBOL source program optimization guaranteed to increase the efficiency of your programs. It works! Most customers report average savings of 35% in execution time. Low cost, too. A 2000 card program OPTIMAIL costs you only \$155. Get the facts.

Tell me more about OPTIMAIL!

Name _____

Company _____

Address _____

City _____ State _____ Zip _____

Telephone _____

Clip and mail coupon to: OPTIMAIL, 5530 Wisconsin Avenue, Suite 1600, Chevy Chase, Maryland 20015. Or call (301) 652-9220.

Special Report

IBM's Old and New



Independents Set Sights: 1403 Printer Is the Target

By Ronald A. Frank
Of the CW Staff

When users consider independent peripherals as IBM replacements, they invariably think of tape drives, disk units, even card equipment — but not printers.

For years the 1403 chain printer has been a bread-and-butter item. The Model 1 was first used with the 1401 CPU and while no longer available, IBM has reshaped the 1403 in no less than six other models plus the souped-up N1. But with all the variations, it is still the same 1403.

But times are changing. IBM is about to deliver its new generation printer, the

for several reasons.

The 5403 is really a subsystem. The user gets a controller, up to three printers and many extras that add up to some real improvements over the IBM printer.

The Telex printer operates either off-line or on-line depending on the job, and either mode of operation is switch-selectable on the controller. The IBM 1403 has long operated only on-line. Then last August, just about the time Telex came out with the 5403, IBM introduced a new RPQ (Request for Price Quotation) feature. And the 1403 had acquired an off-line capability.

But the IBM feature, designated 2927, gave the 1403 user a dedicated off-line operation. If the user decided to go off-line, he stayed off-line, at least with that printer.

The Telex system has other advantages. The user has a 288-character printing set compared with the 240 characters in the 1403. Also, the 5403 runs at 1,200 line/min while the IBM printer operates at 1,100 line/min. But while the extras are there, the cost savings are less than the 15% to 20% users have come to expect from independent peripherals. The user can cut costs "in the vicinity of 10%," according to Murphy.

One early user of the Telex printer system is Sunset House in Los Angeles. "We save a lot on speed because this system is about 15% faster," says J.P. Dunlevy, manager of computer operations.

The mail order firm prints "about a 100 million labels per year," Dunlevy says, and he is seriously considering the addition of the on-line/off-line switch to his system. "We are getting a second Telex printer soon and if we add the off-line capability we will probably be able to free up one partition on our 360."

The 5403 has been in operation for about five months and despite some initial start-up problems, the print quality is "just as good" as the 1403, Dunlevy notes. There were some problems in keeping the print train clean but that has now been solved, he adds.

Potter Instrument is planning to deliver its 1403 equivalent system in the third quarter of this year, according to Vince Jones, manager of product marketing. Designated the LP 3403, the printer will operate at about 1,500 line/min. On a two-year lease, the Potter system will cost

The new IBM 3211 printer, at left (front), operates with the 370s and "most" 360s. The two printers to the right of it are the earlier 1403 model. The Telex 5403 printing subsystem, below, costs less than the 1403 and has more features. It can operate on-line to a 360 or off-line from a print tape.



Independent Replacement

about \$1,150/mo compared with an IBM price of \$1,550/mo for the N1 system. While the LP 3403 will outperform the N1 in speed, it will not match the on-line/off-line capability of the Telex system.

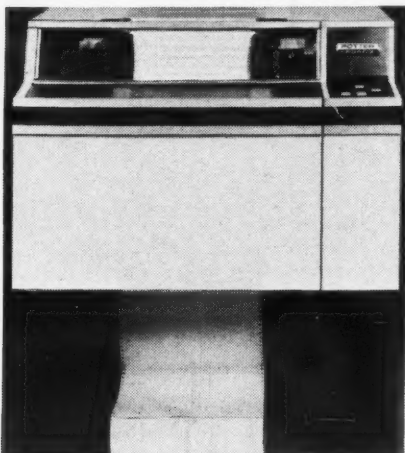
"We expect to market this product mainly as a stand-alone off-line system," Jones says. "The LP 3403 will be able to utilize three tape drives in with three printers out. This will enable the user to

simultaneously print out in three different formats," Jones feels.

The IBM 3211 operates at 2,000 line/min with a 48-character train repeated in nine arrays. It can run with the 370s and "most" 360s, according to the company. But a user who wants the high-speed unit will have to pay \$2,800/mo with the normal IBM rental arrangement.

While there have been few rumbles from

(Continued on Page 9)



The Potter 3403 printer replaces the IBM 1403 and will be delivered later this year.

3211, and the independents are coming out with replacements for the illustrious 1403.

Why has it taken so long to upgrade the 1403? IBM doesn't comment on this, but the independents say they have held off until their replacements could match the 1403's reliability.

"The technology to produce a printer is very demanding," says Mike Murphy, director of sales at Telex. And industry experts agree. "Whenever you have an electromechanical system with that many moving parts, you generate friction, and all kinds of things can go wrong," says one engineer.

Telex first delivered its 5403 "functional replacement" for the 1403 last fall. The company is careful to avoid the well-worn "plug-compatible" description

Non-Impact Printers Gaining

Although they have been adapted in specialized applications, non-impact printers have been slow to gain widespread acceptance by users. These types included only about 1.2% of the printers installed by users in 1971, according to Creative Strategies Inc.

Two of the major non-impact types are the ink jet printer which sprays a character onto the paper and the matrix device which "assembles" a character in a dot pattern similar to a CRT display. A third type is the electrostatic printer which requires specially coated dielectric paper that allows a character to be "burned" into the surface.

"Paper costs have been a problem with the electrostatic printers," according to Dave Beaber of Arthur D. Little. "It still costs from two to four cents per page for this type of printing," he estimates.

With the ink jet printer there was a problem at first with clogging of jets and similar operating faults, but they are now more reliable, according to Creative Strategies.

The largest growing type of non-impact printer is the "hard-copy" devices that operate with CRTs, Creative Strategies estimates. These devices reproduce a CRT image on various size sheets, using different techniques to reproduce the screen display.

The main problem with the ink jet units is that the user is limited to one copy unless he duplicates his printing cycle, one observer says. But the printers seem to have their place where noise or the lack of it, is important. And ink jet printers are being used at sites such as hospitals, according to one source.

The matrix printer is catching on in certain applications. Centronics Corp. has been supplying matrix printers for about a year to more than 1,000 sites, according to a company source. The firm has a model which prints 5 by 7 or 9 by 7 dot alphanumeric.

"The users of minicomputers are going to business-type applications where they need a printer," according to Ron Huch, Centronics vice-president. The Centronics printer interfaces with most minis, and at 165 char./sec it is one of the few units available.

"The interface is a relatively simple device. Usually you are talking about one printed circuit card," Huch says. In addition to allowing the user to operate directly on-line, the Centronics print speed is the equivalent of 1,200 bit/sec, and this makes the unit adaptable for remote printing jobs via communications lines, Huch feels.

IBM also has a matrix printer but only for limited applications. The 3215 is primarily a console printer that operates at 85 char./sec with the 370/135, 145 and 155. Characters are formed by seven vertical wires each printing a dot in four of seven possible positions. For Selectric devotees, the IBM 3210 can be used with the same systems at the standard 15 char./sec.

Hytype I Has Few Moving Parts

New Print Technology Making Strides

In both the low- and high-speed areas, new devices are challenging the established printers.

Diablo Systems Inc. recently introduced a servo-controlled printing mechanism with very few moving parts. And users may see printers based on the Diablo system, called Hytype I, before the end of this year, according to Einar Asbo, assistant director of engineering.

Significantly, the Hytype unit prints at 30 char./sec, while an IBM Selectric prints at 15 char./sec. "Even though the device prints twice as fast as the Selectric it is priced competitively," Asbo says.

Among the mechanical features of the Hytype I is its proportional spacing which

can be varied into 60 segment/in. In addition, Diablo engineers have "disconnected carriage motion and printing," according to Asbo, so that the printer spaces only after all operations are finished. "The user can print an accent mark, letter and an underline all without moving the position of the carriage," Asbo explains.

Asbo also expects the Hytype printer to be attached to minicomputers where the teletypewriter would be too slow and a line printer would be "an overkill."

The biggest opportunity for new printing development is in the "super high-speed range" of 10,000 to 30,000 line/min, according to Dave Beaber, a staff consultant of Arthur D. Little. One of the "hottest experimenters" with fast printers is Xerox, Beaber says.

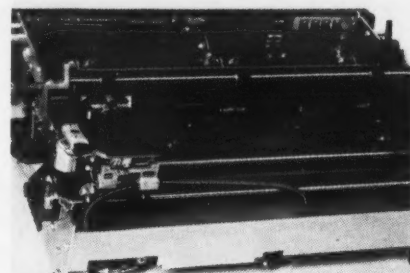
The University of Toronto is currently

testing a "xerographic" printer that uses plain paper, according to one source. "It is an experimental printer that prints at about 15 sec/page," a spokesman at the Toronto University library Automation Systems Division says.

The printing process for the device is controlled by a special program in the library's Sigma 7 system. "Each character is programmed individually so you can print any character you wish," the spokesman says.

Printer Forerunner

While the device now is slow, it could well be the forerunner of a new type of printer. "It's really a combination of a facsimile device and a copying machine hooked up to a CPU," a Xerox spokesman says. "It's a one-of-a-kind application that would not be economical to develop into



The Diablo Hytype I has few moving parts and may replace the IBM Selectric.

a product in its present form."

But it is known that Xerox's Rochester Technology center is actively experimenting with xerographic and other printing techniques. "Xerox Corp. is deeply interested in both xerographic and electrographic printing methods," a Xerox spokesman says.

And that's not all. "IBM is expected to introduce a non-impact printer of the xerographic type," according to Creative Strategies Inc., a firm which analyzes DP trends.

Independents Target 1403 Replacement

(Continued from Page 8)

the independents about possible replacement systems for the 3211, some offer viable alternatives. "Two of our 5403 printers can give a user 400 line/min more throughput than the 3211, and it would be priced competitively," says Telex's Murphy.

The first 3211 user, according to IBM, was the marketing services division of R.L. Polk. "The installation was surprisingly quick, considering it was the first," according to Don Waddell, Polk's DP manager.

One "negative thing" with the 3211 was the "extremely expensive" price of ribbons, Waddell claims. "Within several months after the 3211 installation (last December) other ribbon manufacturers began to supply compatible ribbons," he adds. These independent ribbons cut Polk's costs by about 50%, according to Waddell. "It's the difference between an independent \$18 ribbon and one that costs \$33 from IBM," the user says. "We run a 3211 ribbon anywhere from two to six hours."

And ribbon costs can add up at Polk since the installation has nine 1403s in addition to the 3211. Compared with the earlier 1403, the new printer costs 80% more while providing a 100% increase in throughput, Waddell estimates.

Eventually, Polk plans to replace ten 1403s with about five 3211s. And would Polk look at 3211-compatible printers when they become available? "We'll consider anything. We're very price/performance conscious," Waddell adds. The entire printing operation at Polk is being handled by a 370/155.

Included with the 3211, Polk has the 150-character printing option "that gives the ability to print computer-generated letters on 8-1/2 by 11 stock, two up," Waddell claims. The most impressive 3211 feature is its quiet, he thinks. "When the cover is closed, it is a much quieter unit than the 1403."

Not all the independents are convinced the 1403 printer should be replaced. In fact, some believe its versatility should be spread around to non-IBM systems.

"Our interface will take a 1403 and adapt it with very little extra effort to almost any computer system," says Ray Lorenz, president of Spur Products Corp. in Santa Monica, Calif.

The Spur device is really a controller that can be purchased for about \$9,000, Lorenz says. "Users who want the print quality of a 1403 and are critical about the quality of their printouts can use our device instead of finding an alternative," Lorenz noted.

The first 1403 controller is scheduled to be installed in May and Lorenz says his company will also introduce other universal controllers for additional types of peripherals.



As the 'Garavan' Rolls . . .

Incoterm Announces:

- Feb. 22 - Add-on memory for its 'intelligent' CRT display terminals
- Feb. 29 - Expanded character set and text editing features
- Mar. 7 - Party line controller for SPD 10/20
- Mar. 14 - Remote front end processor for communication networks
- Mar. 21 - Assembler for the SPD 10/20 programmable CRT
- Apr. 4 - Three new offices; expanded sales force
- Apr. 10 - TC - 500/700 communications compatibility
- Apr. 18
- Apr. 25

INCOTERM™
CORPORATION

... the international computer terminals people.

8 Strathmore Road / Natick, Massachusetts 01760

Tel: (617) 655-6100

Atlanta • New York • San Antonio • Chicago • Los Angeles
London • Paris • Ashdod, Israel

Editorial

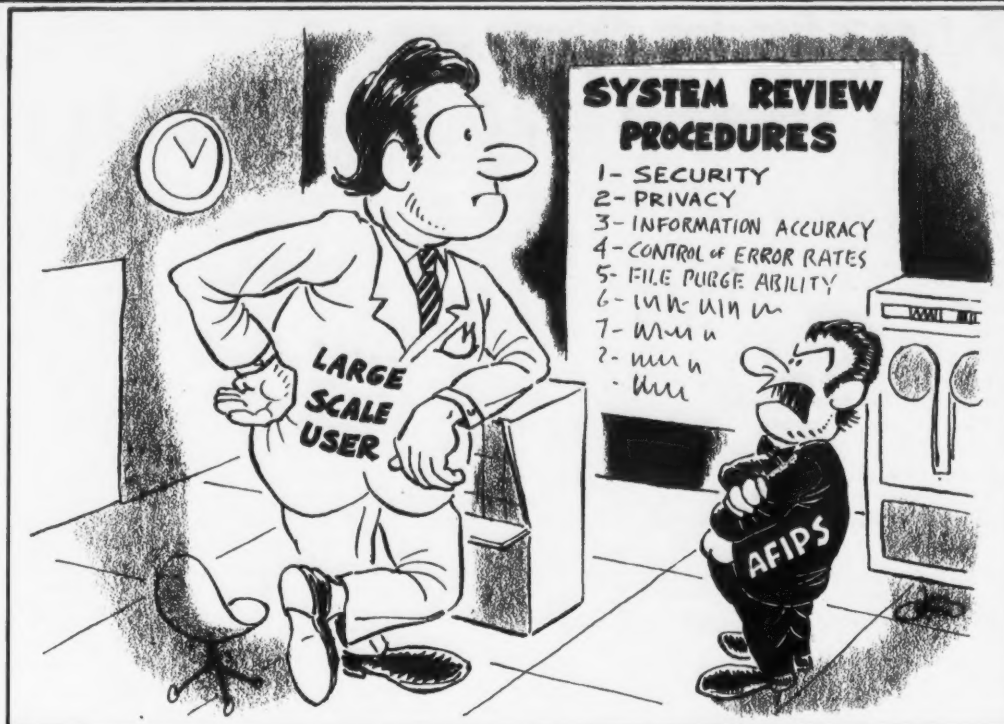
Even Its Own Mother...

The System 360, rather than becoming obsolete, is rapidly becoming its own ancestor. Perhaps the "new" 360s will become known as the "365s."

Take the 360/30. One independent supplier now enables a user to increase his memory to 256K — four times the normal IBM maximum. And another independent provides DOS extensions that allow the user to run six partitions in the 256K — twice the IBM maximum.

At this rate, even the 360's own mother won't be able to recognize it much longer.

But the change is all for the better. No two users' needs are exactly the same, so each user should be able to "custom build" exactly the system he needs.



'If we don't do it, Uncle Sam will!'

Letters to the Editor

'Meticulous Files' May Bring Blackmail

Regarding the article on Creative Research, a ghost-writing company in Ann Arbor [CW, March 22], it should be pointed out that the company (and another one which operates in Ann Arbor in the same way) promises the students that they keep "meticulous files" so that no two students will get the same term paper or computer program. In fact, two students did turn in the same paper last year and were caught.

The students don't realize that these meticulous files form a most pernicious data bank, in which each entry exposes a student to possible blackmail. Also, illegal use of the student's computer identification number can

be (and has been) cause for academic discipline.

I wouldn't recommend this kind of activity either to students or potential entrepreneurs.

Bernard A. Galler
Ann Arbor, Mich.

Acpa Plans Guidelines For DP Professionals

I must commend Dick Brandon for his comments in the Viewpoint article [CW, March 22] about making programmers more professional. His guidelines for action hit so close to home that I could have sworn he's been reading Acpa bylaws and code of ethics.

Yet, from his comments I can tell he's not aware of the purpose and perhaps even the existence of the Association of Com-

puter Programmers and Analysts, which was organized over a year ago to do many of the tasks his article proposed — frighteningly verbatim!

Within a short time Acpa will submit a hefty tome of recommendations to Ansi for standardization of Position Titles in the Computing Field (the preliminary draft is being revised by its author T.D.C. Kuch, Acpa national board member and chief information technology specialist at the National Cancer Institute).

Programmer certification exams are nearly completed for the entry-level programmer — an important step in defining the knowledge required for each level of the programming and analysis professions. All these things take time, effort, people,

money and publicity!

Nelson J. Cyr
Director, National Board/Acpa
Los Angeles Chapter
Norwalk, Calif.

Furr Challenge Cup

The article, "Can Your DP School Meet a Challenge to Excellence," [CW, The Taylor Report, March 29], has generated a great deal of interest at our school. Our alumni association plans to sponsor a contest to compile an entry for the Furr Challenge Cup Contest.

We would like permission to reprint the article in our alumni association magazine along with the announcement of our own contest.

Bonnie Johnson
Vice-President

Control Data Institute
Alumni Association
Pasadena, Calif.

Permission to reprint any material on the Furr Challenge Cup Contest is given, without restriction to any school or alumni association. Alan Taylor.

'Acronyms' Wanted

Thank you for mentioning my publication, *Acronyms*, in a recent issue.

My post office box is literally stuffed with inquiries. Not having mass mail facilities, I'd appreciate your printing the following information: Single copies: \$2 (\$2.50 foreign). Quantity prices are available. Send check with order to: John P. Tutunjian, P.O. Box 93, Jericho, N.Y. 11753.

J.P. Tutunjian

Jericho, N.Y.

Age of the 'Cybernaut'

In answer to your letter, the word "cybernaut" was coined by me some time ago. It was prompted by the use of the word "cybernetics" which has to do with the study of control processes and has been lately exploited by various hardware companies.

I have been associated with DP since Gen O (1957) and have progressed across Gen 1 (IBM

703), Gen 2 (RCA 501, 301 H-200), Gen 3 (360-30/40 Spectra 70) and may even dabble into Gen 4. So you might agree that cybernetics has been my entire professional career.

Now, if one who sails or glides on water is an aquanaut, and one who sails or glides into space is an astronaut, and one who sailed with the mythical Jason in search of the Golden Fleece was an argonaut, why can't we DP professionals who have sailed along through system after system qualify as "cybernauts"?

Ted Hunter
Cybernaut

Andover Institute of Business
Portland, Me.

'Quadruple' Capacity

The article entitled "Fourplex May Be CDC Method to Compete With IBM 3330 Sales" [CW, March 29] suggested that providing capacities and cost/byte equal to that provided by the IBM 3330, using a standard 2316 type disk pack, was unannounced by any vendor and only in development.

Your readers should be aware that Burroughs announced the B9484-4/B9485-4/B9486-4 Dual Disk Pack Drive Memory Systems on Oct. 20, 1971. These dual drives, at a spindle capacity of 60.5 million bytes, are superior in price/performance to the IBM 3330 and are based on a proven technology — the 2316 type pack. This "quadruple" recording capacity is achieved by utilizing double track densities at 200 track/in. and double recording density at 4,400 bit/in.

This technology will allow Burroughs to begin deliveries of the B9484-4/B9485-4/B9486-4 dual drives in January 1973.

Mark A. Lutvak
Manager, Product Analysis
Burroughs Corp.
Detroit, Mich.

Computerworld welcomes comments from its readers. Letters should be addressed to: Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.

Interaction a Must for Professionals

By Don Smith

Special to Computerworld

Dick Brandon recently said that to make programmers more professional and to give them a more meaningful career path one should clearly separate them from systems per se and create a highly structured programming function [CW, March 22]. This would presumably be better for the programmers and the projects.

The individual can then see himself progressing from trainee to super programmer over the next 40 years and the user can see his project proceed nicely down the Pert chart as the facts are gathered, functions designed, documentation written, programs written, etc.

This methodology has been with us awhile and I'm not aware of many spectacular successes. Theoretically, this was possible when we were designing systems to move paper and replace clerks.

But the challenge of the '70s is to design man-machine decision systems with flexible menus allowing decision-makers to interact with the system dynamically, varying its processing scenario as facts and questions change.

Furthermore, we must work with the problems of IMS and TSO (or their equally unstable equivalents), specialized terminals, response times, front end minis and the never-ending changes in the user's mind.

Therefore, it is not a myth but a fact that the analyst had better know plenty about programming, PCB generation, multi-tasking, access meth-

ods and machine utilization.

Also, he'd better be able to write terrific documentation but understand that it won't be the principal means of communication between the two functions or the principal means of getting the job done; he himself will be the means.

Actually, strong interfaces have given way to the

Viewpoint

idea of interaction. Why? For one reason, it is not possible to do any of the eight tasks listed by Brandon to the level of completeness he implies is necessary; and also, because we have realized you can do your job, I can do mine, we can have beautiful documentation but we won't necessarily have an efficient system for the user or for the installation manager.

A dedicated project team, using the top-down method and comprised of analysts, programmers, systems programmers and users can create such a system.

Finally, you cannot make a professional by creating paper mills, rules and superstructures, since a person's relationship with his job is an individual thing. You can hire professionals, you can improve some skills and you can create an environment that will allow him to do the work he is capable of doing.

Smith is senior manager, systems and programming, for the Central National Bank, Chicago.

Tape Flaws Come in Big Packages, Not Small Ones

Tape flaws, the SCDP Technical Committee has found, occur in large-size chunks rather than in small ones! Or, at any rate, they occur more in the range of one thousandth of an inch in size down to half that, rather than in the range from four ten-thousandths of an inch to one ten-thousandth.

This finding is important because it means fewer additional errors will happen as tape users move from 1,600 bit/in. densities to 3,200 bit/in. densities, even though many additional errors were involved when they moved up to 1,600 bit/in. from 556 or 800 char./in.

It is important because it means the bad tape quality which currently exists in many 1,600 bit/in. tape libraries, far from

The Taylor Report

By
Alan Taylor, CDP



provide test facilities at the installation site. He said if they had done so, then the tape users would have seen that the tape quality was maintained.

When the article was published, one tape drive manufacturer, Storage Technology Corp. (STC), was just announcing a double-density tape drive capable of handling 3,200 bit/in. At the time of the announcement, I was expecting an increase in error rate, which I was checking to see whether new tapes would be necessary. Memories of the conversion problems of 556 char./in. to 800 bit/in. to 1,600 bit/in. were clear.

Errors Decrease

The figures STC produced, however, indicated no great increase, and in many cases an actual decrease in the error rate when viewed as errors per 100 million characters read!

As a result, Dick Laatt and John Vickers of STC designed a set of tests especially for the SCDP Technical Committee to check out what was really happening — whether, in fact, the reliability in reading was going up with the increased density. The results (see figure 1) confirm this.

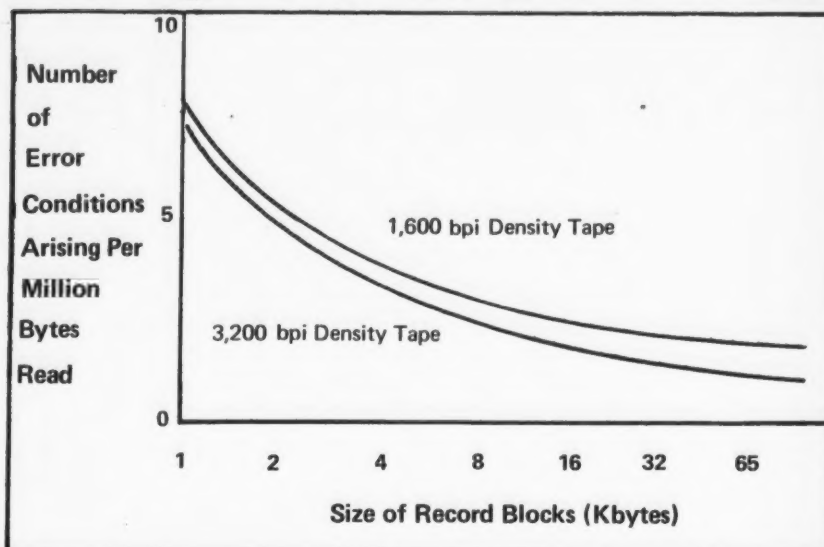
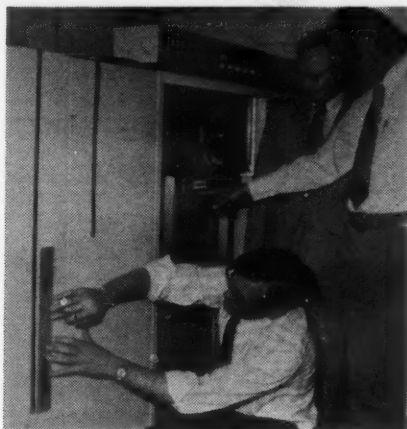


Figure 1. The additional reliability apparently available as a result of doubling the recording density on magnetic tape is shown in the above curves. The upper line represents the number of error occurrences per million bytes read at 1,600 bit/in. This is seen to be up to 10% higher than the equivalent error rate per 3,200 bit/in. read tapes shown on the lower curve, irrespective of block size involved.



While the reliability of the 3,200 bit/in. tape was being checked, the development team ran other tests to show the usefulness of the new capability. Dick Laatt uses an 18 in. ruler to show Alan Taylor and Jesse Aweida, STC president, that a 65K record at the new density (at right) took only 20 inches of tape, while it had previously taken over 40 inches.

holding people back from moving to higher densities, is encouraging them to move up. Not only do they get the incidental advantages of high speed, but they also get more reliable operations as the number of errors per million characters declines.

Manufacturers Blamed

The test that revealed this came on the same day the previous SCDP Technical Committee report on the bad quality of tapes was published [CW, The Taylor Report, March 29]. At that time, Don Collins, committee chairman, blamed tape drive manufacturers for failing to



Jesse Aweida holds the first 3330 disk pack (capacity 100 million bytes) which had been dumped onto a single reel of 3,200 bit/in. tape.

Apparently, the new errors aren't sufficient to outweigh the advantages of getting the information on half the amount of tape needed before.

So, bad tape or poor quality tape reads better on higher density drives! It doesn't appear there is going to be a conversion problem in going to 3,200 bit/in., and that is important.

© Copyright 1972 Alan Taylor. Reproduction for commercial purposes requires written permission. Limited numbers of copies for non-commercial purposes may be made provided they carry this copyright notice. The views expressed in this column do not necessarily reflect those of Computerworld.

Some Definitions for Tape Use

CPI — characters per inch. This measurement of the number of characters of information per inch of tape is particularly useful to help a user compare the storage capacity of various tapes when some tapes have more than one character (generally about one-and-a-third) across the width of the tape. The word "character" became ambiguous with the introduction of the 8-bit byte, which could represent one alphabetical character or two numerics.

BPI — (1) originally, bits per inch. This measurement of how close one bit is recorded to the next is particularly useful to help a user compare the recording capabilities of two types of magnetic tape. When the byte as a unit of information was introduced, bpi became ambiguous, and could only be interpreted from its context.

(2) bytes per inch, since 1964. This measurement of the number of 8-bit bytes of information per inch of tape is used particularly to differentiate between the various recording densities used by 360-compatible tape systems, such as 200, 556, 800, 1,600 and now 3,200.

FCPI — flux changes per inch. This is a measurement of the number of actual changes between north/south, and south/north orientation which occur per inch of tape. It measures how close such changes lie on the magnetized oxide surface. In phase encoding, two flux changes are used to store a single bit of information, so that for this type of coding, used by IBM and other systems for 1,600 bit/in. and 3,200 bit/in. work, the number of flux changes is double the number of bit/in.

SCHOOL: WINCH PARK MIDDLE SCHOOL										GRADE LEGEND	
STUDENT: TAYLOR ALISON										THE FOLLOWING GRADES REPRESENT AN EVALUATION OF YOUR CHILD'S PERFORMANCE IN TERMS OF HIS OWN ABILITY.	
H RM	I D NO	Y O G	PREVIOUS CREDITS	G P A	G P A						
F221	04275	1976									
ATTENDANCE SUMMARY											
A	T	D	A	T	D	A	T	D	A	T	D
2			9			1				11	1
COURSE NAME		CRS NO	TEACHER NAME	1	2	VERBAL COMMENTS					
PEB GIRL		986-05BUCKLEY		C							
MATH		282-02CARDANI		A	A	DOES WELL ON TESTS POLITE AND COOPERATIVE					
HE B		686-04NYGAARD		IN		PROJECTS NOT COMPLETED POLITE AND COOPERATIVE CARELESS FOLLOWING DIRECTIONS					
ART B		780-04QUINN R		C							
FR B TR1		487-02GEORGE		D	D	FAILS TO MAKE-UP WORK NOT ALWAYS PREPARED FOR CLASS					
SCI		383-02ZAHARRA		INA		GOOD ORAL WORK POLITE AND COOPERATIVE EXHIBITS GOOD EFFORT					
LIT		083-04CROWLEY		A	B	EXCELLENT ATTITUDE TOWARD LEARN					
ENG		083-04CROWLEY		A	B	POLITE AND COOPERATIVE EXCELLENT ATTITUDE TOWARD LEARN					
SOC ST		182-01ROSS		B	A	GOOD APPLICATION OF KNOWLEDGE GOOD ATTITUDE PARTICIPATES IN CLASS					
CHOR B		811-02REID		A		GOOD APPLICATION OF KNOWLEDGE EXHIBITS GOOD EFFORT					

Can You Find 12 Items Wrong With This School Report?

The type of school reports arriving at my house have been commented on before, and now a new service is being provided. What grade would you give to the design and implementation of the system? What real difficulties does this report exemplify? Please send your list of corrections to me and I will pass them on to our school committee.

Spring Joint is Coming

Whether or not you plan to exhibit at the SJCC, you should definitely plan to advertise your product or service in at least one of Computerworld's three special SJCC issues.

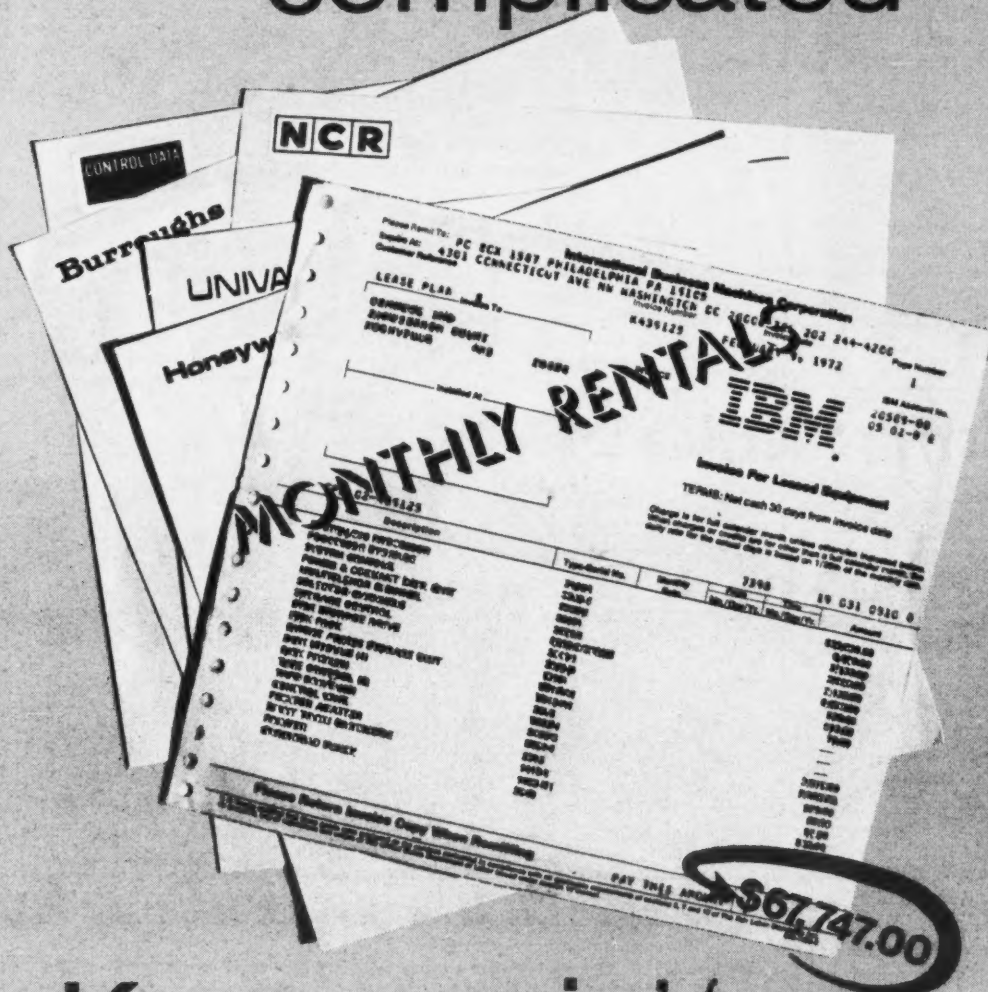
May 10 Preview Issue closes April 28

May 17 Show Issue closes May 5

May 24 Wrap-up Issue closes May 12

Call Dottie Travis at (617) 332-5606 for rates and mechanical requirements. Or write Computerworld's Advertising Department at 797 Washington Street, Newton, Mass. 02160.

For those who think computer simulation and monitoring are too complicated—



Keep payin' 'em.

The cost of data processing is not likely to go down. Hardware manufacturers will go on selling you as many high-speed widgets as they can turn out. And your firm will find more and more applications to computerize. That's as it should be. So what do you do?

Your computer workload is double what it was five years ago, right? You've got a bigger system than you had last year, right? You'll need bigger and faster widgets next year, right?

Wrong.

You don't always need better widgets. Many users aren't running their systems at 50% capacity. You don't need more hardware; you need better utilization.

COMRESS is in the business of saving computer users from computer waste. We call it *computer performance evaluation*. We have tools which allow you to find out how efficiently your installation is running . . . how to predict configuration requirements based on projected workloads . . . how to "tune" your system for optimum throughput . . . how to design your applications to fit your system.

You've probably heard about two of these tools: **SCERT** (a computer simulation technique used for feasibility analysis, systems design, and hardware/software selection); and **DYNAPROBE** (a hardware monitor systems measurement device used to extract utilization data from the host system by means of electronic sensors).

If you'd like to beat the "faster widget" cycle, there is an alternative: *throughput optimization*. Hundreds of installations throughout the world are using **SCERT** and **DYNAPROBE** to do just that. (Space won't permit examples, but we honestly saved one client \$3 million in one RFP evaluation simply by proving, via **SCERT**, that the configuration requirements, as forecast by the manufacturers, were overstated. *Sound familiar?*)

Do our clients know what they're doing? Are simulation and systems measurement really worth the investment? Do they save that much money? Ask some of the real computer-usage pro's . . . people like Bell Labs, Marine Midland, Banker's Trust, Ford Motor Co., INA, Sun Oil, Dept. of Defense, State of California. Ask 'em about **SCERT** and "the Probe". *Before you upgrade again.*

Then call us. We'll be here. As long as the widgets, anyway.

For further information, contact:
Product Information Dept.
Two Research Court
Rockville, Md. 20850
(301) 948-8000

COMRESS



Please send me additional information on:
☐ SCERT®70 Simulator
☐ DYNAPROBE® Monitors
☐ Have someone contact me.

Name _____
Title _____
Company _____
Address _____
City _____
State _____ Zip _____
Telephone _____ Area Code _____

April 12, 1972

Page 13

Random Notes

**TLM Sort/Merge for PDP-11
Handles Variable Records**

WAKEFIELD, Mass. — A new version of the Sort/Merge program for DEC PDP-11 users, available from TLM Systems Associates, includes support for industry-compatible magnetic tape drives, accommodation of variable-length input records and the availability of user exits in both the input and merge phases of the sort.

The package will handle records of 1,024 words in length, and can use 16 sort keys. Sorting can be of ascending or descending sequence and the package works with five data types. The firm is at Two Smith St., 01880.

**McDonnell Douglas Adds Payroll
On Remote Processing Basis**

ST. LOUIS — Clients of McDonnell Douglas Automation can have payroll checks and related reports printed at their terminal locations less than 24 hours after they submit input to the system, under a new service offering. Reports generated each time a payroll is processed include earnings statements, payroll register, check register, employee's deductions and a labor distribution report. Quarterly and annual governmental reports are also generated on a timely basis, the company said.

GE Alters Pricing Schedules

BETHESDA, Md. — New pricing options on the GE Mark II time-sharing service, in effect April 1, include reduction in storage costs and a 40% to 60% reduction in charges for deferred processing. The most significant change, spokesmen said, allows the business user with large data bases to elect lowered storage prices in exchange for "slightly increased" computational prices.

'IMS/Culprit' Enhanced

BOSTON — The IMS/Culprit system, by which Cullinane Corp.'s Culprit serves as a report language for IMS/360, has been enhanced through the addition of a "user exit" at extract time. This facilitates table lookups, file matching and file updating, Cullinane explained. It also allows the Culprit user to take advantage of IMS calls such as Get Unique, and to access non-IMS files during an IMS run, the firm said.

The IMS/Culprit package costs \$20,000 for a three-year lease. Cullinane is at One Boston Place, 02108.

Uses ANS Subset**Cobol Interpreter Available for 3/10**

By Don Leavitt
Of the CW Staff

WEST BEND, Wis. — IBM System 3 Model 10 users with minimum core and a Multifunction Card Unit (MFCU) can program in Cobol with the Simplified Interpretive Cobol Operating System (Siclops) from General Systems Services.

A load-and-go translator/executive that supports a subset of ANS Cobol, Siclops takes 4K of core at the beginning of the processing. As the user's source code is read, it is converted to a pseudo-object code image directly in core.

Some parts of Siclops are overlaid as the

object code is generated. Ultimately, the user program and work areas may occupy as much as 6K bytes of memory in a minimum configuration, a spokesman noted.

The techniques used in Siclops were developed, the company said, as part of a comparable Cobol interpreter implemented on an IBM 360/20.

The pseudo-object code is said to be more conservative of core than conventional machine-language object code. Although execution is slower than with normal object code, the difference is transparent to the user.

Source code features supported by Siclops were chosen specifically because they are common to many ANS Cobol compilers. Siclops programs can be compiled and run, with very little modification, on many CPUs.

All basic data definitions, file descriptions, arithmetic, logic, I/O and control statements are available to the Siclops user. The system allows the use of multiple moves, subscripting, and special editing routines, the spokesman claimed.

The system can be run in either debug or run mode. In the former, extensive diagnostics, program tracing and data area contents can be displayed on the printer. These development aids are bypassed and execution is optimized in run mode, the company said.

Siclops requires a 5203 or 1403 printer and a 5424 multifunction card unit (for System 3's 96-column cards) attached to an 8K Model 10.

Siclops can be purchased for \$1,200, the equivalent of "one-year's" monthly lease payments for IBM's Cobol compiler for the System 3, scheduled later this year.

General Systems Services can be contacted through P.O. Box 561, 53095.

**'Host' CPU, One or More S/7s
To Be Linked by IBM Software**

WHITE PLAINS, N.Y. — IBM has two new program products with which engineers with little DP experience can program an IBM System 7 to monitor and control production equipment.

The Application Program Generator (APG/7) uses a 360 or 370 to generate application-oriented questionnaires, and to convert the engineer's answers to the questions into programs for the IBM 7. APG/7 provides a subset of PL/1 for engineers who must code complex calculations and specialized operations.

The second product, System/370 Distributed System Program (DSP), provides a means of transmitting the completed application program from the 360 or 370 "host" to the System 7 for execution. This program thus links the capabilities of the host with those of one or more IBM 7s to form a single system.

The new products are scheduled for availability in the first quarter of 1973.

APG/7 is expected to use 131K bytes of core under OS or 65K bytes under DOS. If the PL/1 subset is used, program execution on the S/7 will require 6K bytes, a spokesman said.

System/370 DSP will be available free. APG/7 will be available under license for \$150 for either DOS or OS.

Module Clears Program Checks

SHERMAN OAKS, Calif. — Execution of the cross-reference listing option on the bundled ANS Cobol compilers distributed with IBM's operating systems is optimized with the BCCXREF software package from Boothe Management Systems.

Thus, users previously familiar with the option will get through the compilation process faster than before, and users who

felt they did not have the time to get the cross-reference may reconsider their decision.

The product is said to cut by 50% the time required to produce the cross-reference list. The unoptimized XREF routine often took twice as long as the compilation of the program itself, according to a Boothe source. Users were faced with a choice of that much overhead versus the value of the cross-reference list for debugging and documentation.

Transient Routine

Boothe's package is a transient routine which affects two modules within IBM's free ANS Cobol compilers. References to these modules would render the BCCXREF useless with any other compiler, the spokesman noted.

The reduction in CPU usage, with the corresponding drop in elapsed time for each compilation, is said to be particularly evident in the multiprogramming mode as it increases overall availability of system resources for production work.

Boothe offers the BCCXREF enhancement package to either DOS or OS/360 users for a one-time charge of \$250/CPU. Boothe Management Systems is at 15432 Ventura Blvd., 91403.

'XREF' List Production Eased

NEW YORK — A Program Check Debug Module, available for \$20/mo from Data Access Inc., may reduce development time of Cobol or Assembler language programs by as much as 40%.

During program debugging, the module supersedes the IBM Supervisor as a program check occurs. It inspects the old PSW (program status word), determines the type of program check and proceeds with appropriate action to allow the test to continue.

"Appropriate action" might include zero-filling blank numeric fields or generating a sign for an unsigned field used in arithmetic operations.

This module appears to differ from others with similar capabilities because it includes three exits through which the user can reach his own coding.

In addition, a production version of the module is also available. This takes the same types of actions as the debugging version, but records the actions on a disk or tape file so as not to spoil any special forms or reports in the printer.

The module is cataloged in the relocatable library and link-edited at object time. As an alternative to the monthly lease cost of \$20, it may be purchased for \$900 from Data Access at 1123 Broadway, 10010.

find out why

**GENERAL LEDGER**

is hard at work for 27
of the biggest US corporations:

OK... what do they know that I don't? Tell me all about the MMS General Ledger Package and how it:

- is tailored to my exact specifications
- prepares variable and fixed budgets
- provides automatic overhead allocations
- operates in either DOS or O/S (Cobol) on S/360 — S/370 with a minimum of only 32K
- handles up to 999 levels of reporting
- is fully warranted for one year!

name	title		
company	street		
city	state	zip	
computer system	phone		

By the way I am also interested in your other packages, namely

☐ Accounts Payable ☐ Accounts Receivable ☐ Job Cost ☐ Inventory Management.



Send to:

SOFTWARE INTERNATIONAL CORPORATION

A Subsidiary of MMS, Inc. 279 Cambridge Street Burlington, Mass. 01803 (617) 272-2970

BOSTON	617-272-7731	ATLANTA	404-255-0039
NEW YORK	212-986-2515	LOS ANGELES	213-622-3996
CHICAGO	312-332-4576	PHILADELPHIA	609-228-1100
SAN FRANCISCO	415-421-0426	DALLAS	214-631-6020

THE COMPUTER CARAVAN

The Great Lakes Computer Users'
Forum and Exposition Is Coming to

DETROIT



April 25-27
Cobo Hall
New Exhibit Hours
1:00 p.m. — 7:30 p.m.

Sponsored by COMPUTERWORLD (617) 332-5606

Card Entries, Disk Changes, Reports Prepared Through 'Argus' Parameters

EVANSVILLE, Ind. — IBM DOS users can increase their capabilities with the Automatic Report Generator and Utilities System (Argus) package from Vincent K. Lynxwiler. In addition to easing preparation of printed output, Argus also supports operations using card and disk files.

The system is parameter-driven and requires no compilations or assemblies prior to use. Either Isam or sequential disk files may be used as input to the report generation capability, Lynxwiler said.

Argus can also be used to edit card files against details carried in the parameter cards or in the user's disk file. This lets users check valid transaction codes; good account numbers; acceptable data types, by field; and transaction amounts within specified limits.

The system can reorganize Isam files, eliminating unwanted records and shifting overflow records back into the primary storage areas as space becomes available. Isam files can also be created with new extents, according to Lynxwiler.

Sequential disk files are created from Isam files, or vice versa, under control of Argus parameters. Subsets of either type file can also be created for use as test data, he added.

In generating reports under Argus, the user can define as many as six heading lines and eight detail lines. Totals and subtotals, or totals only, are system options, along with record and field selection, editing and forms control capabilities.

Argus operates as a DOS job and requires no operator intervention if parameters are entered correctly. Error messages are printed in coded form, and explanations are in the user manual. A UPSI card option, however, allows the system to generate the explanation on the printer, Lynxwiler noted.

The system is written in BAL and uses between 12K and 22K of core, depending on maximum record sizes in the user files. All card readers and printers are supported, along with the 2311, 2314 and 2319 disk drives.

Argus can be purchased from Lynxwiler through P.O. Box 732, 47712.

Scert 70 Simulator Uses Job Profiles Generated by CPU

ROCKVILLE, Md. — Computer-generated performance profiles of existing applications workloads replace manually prepared system definitions for users of Scert 70, the latest version of the Compress computer performance simulator.

The performance profiles used by Scert 70 are created from the output of a hardware monitor and operating system accounting data, brought together by a new subsystem, Dynascert.

Elapsed clock time, as well as CPU time — for both problem and supervisor states and amount of memory used — are among the factors considered. These also include the number of I/O initiated, and the partitions and devices in use.

To generate these profiles, Scert 70 uses either Compress's Dynaprobe 7900 Computer Performance Monitor or Dynaprobe 416 hardware monitor, and version 1 of the Dynascert data consolidation system.

Dynascert, in turn, requires IBM's System Measurement Function (SMF) feature of OS. Thus, Scert 70 is now limited to IBM 360 or 370 installations, Compress acknowledged from Two Research Court, 20850.

DOS Functions Eased By Modules From BDS

NEW YORK — Two packages from Boothe Data Systems Inc. (BDS) let DOS/360 users optimize certain system functions. Execution time of the DOS Setl function, for example, is cut 60%, the company said, with its Coresetl package which allows the function to be core-resident.

Users with programs doing frequent overlays, especially teleprocessing programs that use the Load macro to bring in transient phases, are said to cut DOS Load and Fetch time for foreground programming phases by 80%, using Fast-Load, the other package.

The Coresetl package includes a module with the same name added to the relocatable library, and a replacement for the IBM-supplied Setl macro in the source library.

Fast-Load supports 2314, 2319 and 2311 disks and will increase user program sizes by 304 to 326 bytes for the loader, and from 10 to 17 bytes for each loading phase, according to the company.

Speed is gained by reading full tracks, including as many as four 1,688-byte phase blocks, rather than one phase block at a time, from the disk library.

Boothe Data Systems Inc. is at 135 West 50th St., 10020.



All-pro line-up.

Nashua disc packs and computer tapes are winning fans everywhere.

Which is hardly surprising. After all, they're designed to meet or exceed all known industry specifications. Each is 100% certified and ready for immediate delivery.

Nashua can do it because we're a leader in

magnetic coating technology, with the capabilities and resources to produce the finest random access storage devices.

When you want to deal with the pros, talk to Nashua Corporation, Nashua, N.H. 03060. Tel: (603) 883-7711. Or your nearest Computer Products Division sales office...

Atlanta, Ga., (404) 631-0811
Chicago, Ill., (312) 721-1000
Cincinnati, Ohio, (513) 731-3643
Cleveland, Ohio, (216) 696-5671
Columbus, Ohio, (614) 268-4356
Dallas, Texas, (214) 631-7334
Denver, Colorado, (303) 355-6160
Detroit, Michigan, (313) 886-9890
Hartford, Conn., (203) 527-9883

Houston, Texas, (713) 664-1934
Indianapolis, Indiana, (317) 635-0327
Kansas City, Mo., (816) 254-9222
Los Angeles, California, (213) 537-4250
Milwaukee, Wisconsin, (414) 447-1122
Minneapolis, Minnesota, (612) 888-2211
Nashville, Tennessee, (615) 255-7154
New England, Nashua, N.H., (603) 883-7711
New York, New York, (212) 532-6500

Philadelphia, Pennsylvania, (215) 839-3535
Phoenix, Arizona, (602) 267-1991
St. Louis, Mo., (314) 421-6687
Seattle, Washington, (206) 623-0490
Somerville, New Jersey, (201) 722-2922
Washington, D.C., Arlington, Va., (703) 524-8880

NASHUA

BASF 2000 A.D., a new tape that's too tough to trick.

Any tape error can cost you recycling time and dollars.

That's if you're lucky.

(If you're not so lucky, a tape goof can lose important data forever. Then what's the cost?)

So we've been working to come up with a tape that would reach you error-free, and would remain error-free. In other words, a tape that's too tough to trick.

We now have that tape. BASF/2000A.D. 3200 fci.

BASF/2000A.D. is coated with a smaller-particle oxide dispersion that we developed in our own labs. The smaller particles can be applied more evenly, more compactly, more

completely than ever before possible.

Result: greater sensitivity and uniformity, in a thinner coating.

The thinner coating, in turn, means a more flexible and flatter-lying tape. Result: better head wrap, better capstan control, better head contact.

What about durability? Good question. Even though our new BASF/2000A.D. coating is thinner, it's also harder than conventional coatings. And less abrasive. Result: less head wear, longer tape life, greater longtime reliability.

And finally: our new BASF/2000A.D. base is a premium polyester, biaxially oriented. Edges are the cleanest in the

industry, cut to a tolerance of ± 0.001 " (vs the industry standard of ± 0.002 "). We QC every step, from milling to packing. And we certify every tape.

There's one thing we *don't* do to our latest tape. We don't sacrifice any of the push for perfection that has always characterized our previous tapes. BASF/2000A.D., in other words, is quality added on—not a trade-off.

As you can see, a tough way to make computer tapes. But you can see something else, too: It can sure make life easier for you. Why not write for more details?

BASF Systems, Inc., Computer Products Division, Crosby Drive, Bedford, Mass. 01730



Computer Products



Meet the mind expander. Monolithic Main Memory from **ITEL**.

Now there's an easy, economical way to expand IBM System/360 or 370 memory: add on Monolithic Main Memory from ITEL. (The Monolithic Main Memory is manufactured to ITEL specifications by Advanced Memory Systems of Sunnyvale, California.)

This monolithic memory lets you upgrade core at a lower price than core. It's far more reliable than core. And you can maximize capacity. For example, you can expand the 360/30 to 128K, the 360/40 to 512K, the 360/50 to 1024K and the 360/65 to

2048K. For the 370, we match IBM byte for byte, and offer substantial savings in cost and space.

The secret of ITEL's superiority over IBM core is found in its basic monolithic memory module. This semiconductor chip contains 1024 bits of storage. These memory elements are fabricated in batches of thousands, which cuts costs dramatically. And most wired interconnections are eliminated, so there are far fewer potential sources of failure.

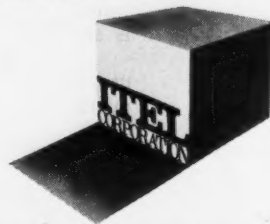
But even monolithic memory elements can sometimes fail. That's why ITEL has ECC: Error Checking and Correction. Should a memory

element fail, ECC corrects the error instantly. There is no effect on computer operations or processing. The operator is notified by an error light and maintenance can be performed without interrupting the memory's operation.

The Monolithic Main Memory from ITEL means savings in cost. Savings in speed. Savings in maintenance. And, in some cases, savings in floor space. It's completely compatible with IBM System/360 and 370. Handles all memory size changes. And it can be leased as

well as purchased, so you can meet your immediate memory needs now without a large outright purchase.

ITEL is out to improve the system. With technical advancements. Complete corporate sales support. National field service. Around-the-clock maintenance. And with the people and financing policies that can create a customized solution to your particular problems. So meet all the ITEL mind expanders at your nearest ITEL office.



ITEL Corporation, DPG, One Embarcadero Center
San Francisco, California 94111, Phone: (415) 989-4220



System Connects Devices To Lines Automatically

LIVINGSTON, N.J. — The Automatic Telephone Line Connect System (Atlc) from G-V Controls provides connection of subscriber equipment to remote sites.

The central control unit will seize a telephone line upon com-

mand, dial a preprogrammed telephone number, transmit and receive handshake verification tones, transmit the line to the subscriber's device and automatically disconnect at the end of transmission.

Communications

The remote control unit answers the telephone line ringing, transmits handshake tones to the

Multiple Modules

central unit, receives the verification tone and then transfers the line to devices at both ends. If central control units are used at both ends, complete calling and answering at both ends are provided, the company explained.

Several remote stations may be handled from a single central station by adding multiple address modules. A configuration to automatically poll each remote station in sequence is also available. Another version includes a remote station which will refuse the call if no data is to be transferred.

Vadic 16-Channel Data Station Monitors Communications Network

PALO ALTO, Calif. — A 16-channel data station for computer sites will monitor telecommunications network operations.

Vadic Corp.'s VA1616 uses front-panel displays and diagnostics to give site supervisors and operators a clear picture of the network.

Front panel lights show a continuous pattern of traffic. One light per modem exhibits channel status and a blinking red light alerts operators to a malfunctioning channel. Status of EIA interface lines from a

selected modem is shown on a front panel register.

Local and remote tests can quickly pinpoint trouble on any channel, the company said, if the problem is in the modem, computer, telephone line or terminal. Front panel switches control remote and local loop back tests for any modem in the system; 300 and 1,200 baud test signals are built into the unit and automatically routed to a selected modem.

A VA1616 with sixteen 103-type modems costs \$3,840, about \$240/channel. Delivery is 30 days from 916 Commercial St., 94303.

For Lease
Teletype
Model 33ASR
with tape
perforator
and reader—
\$50 per month.

Model 33KSR
send/receive—
\$37 per month.

Available in any quantity
for immediate delivery—
includes nationwide
maintenance service.

Call or write:
RCA Service Company
A Division of RCA
Technical Products Service
Bldg. 204-2, Camden, N.J. 08101
Phone (609) 963-8000
Ext. PY-4129

RCA

DEC Adds Error Detection Option

MAYNARD, Mass. — High-speed error detection computations for serial synchronous transmitted data are performed by a hardware option for DEC's PDP-11 minicomputer.

The KG11-A communications arithmetic option is used with one or more synchronous line interface units, and allows the PDP-11 minicomputer to be used more efficiently in IBM-compatible binary synchronous remote batch, remote concentrator and front-end preprocessor applications.

The most popular polynomial computations for the error detection required by both domestic and foreign communications systems are provided.

The KG11-A occupies a single slot in a standard DEC peripheral mounting unit. Priced at \$750, the KG11-A is available for immediate delivery.

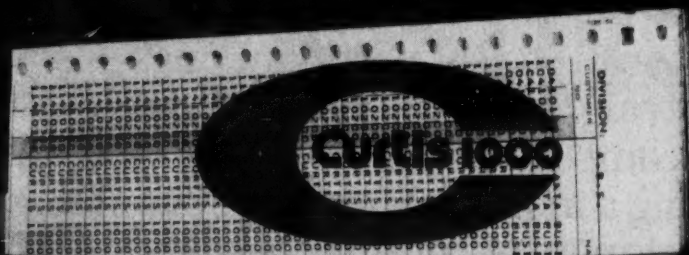
Compudex is pleased to announce publication of the **MASSACHUSETTS DIRECTORY OF COMPUTER SERVICES, SYSTEMS AND SUPPLIES, 1972 Edition.**

- A valuable reference for both new computer users and experienced professionals
- Contains over 5000 cross-references to 310 detailed company descriptions
- Identifies over 380 sources of hardware, software, services and machine time
- Information obtained from survey of every known vendor in state
- Handsomely printed 94 page volume

Send name and address with \$10.30 per copy to:

Compudex, P.O. Box 405, Bedford, Mass. 01730.

envelopes and business forms go together naturally...



Of all national suppliers, only
Curtis 1000 offers you both business
forms and a full line of envelopes.

Your local Curtis One Thousander is a
business forms specialist and
an envelope specialist. So he can be
twice as valuable when he calls!

He offers standard and custom
business forms and envelopes. Also
uniquely special business forms
and envelopes and combinations
—time and money savers
available only from Curtis 1000!

Ask your Curtis One Thousander for
samples, information, ideas!
(We support our 326 salesmen from
facilities in every region
—from border to border and
from the Rockies to the Atlantic.)

Or write to Jack Holloman,
General Sales Manager, Curtis 1000
(Ref. CW-10), 1000 Curtis Dr.,
Smyrna, Ga. 30080.

...but only Curtis 1000 offers you both

WE WROTE THE BOOK ON MINICOMPUTERS.

Our book is full of pertinent questions and straight answers about "how to buy a minicomputer."

Buying a minicomputer isn't simple. There's a lot more to consider besides mainframes and cycle time. You have to stack your requirements against a whole system: peripherals, software, interfacing, reliability, and service.

We think we're pretty well qualified to write the book on all these things.

After all, we're the number 2 company in the minicomputer business, and on our way to becoming number 2, we've installed over two thousand minicomputer systems in hundreds of applications.

Each of those two thousand systems is built around one of the Nova line of minicomputers — the broadest line of 16-bit computers available, offering the best price/performance in the business.

These systems use Data General's broad range of software, including Extended FORTRAN IV, Extended ALGOL, Disc Operating System, Time-Sharing BASIC, and assemblers, editors, and utility packages.

They also incorporate a long list of

Data General peripherals, from discs to System 360 interfaces to line printers to mag tape units to A/D converters.

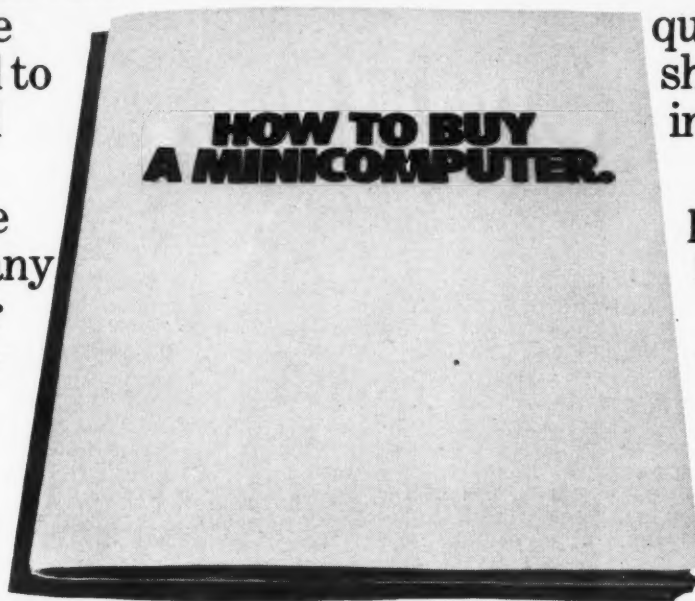
In the course of installing those two thousand systems, we've heard a lot of good questions about minicomputers — enough questions to write a book called "How to Buy a Minicomputer."

Section I of our book has questions and answers you should think about before buying anybody's minicomputer.

Section II stacks our products against the questions raised in Section I.

After you've read the whole book, we think you'll be more likely to buy something from us.

That's how we plan to become the number 1 minicomputer company.



FREE. Send me your free book, "How to Buy a Minicomputer."

Name _____

Company _____

Address _____

City _____

State _____ Zip _____

 **DATA GENERAL**

Southboro, Massachusetts 01772, Tel. (617) 485-9100

THE COMPUTER CARAVAN
presents

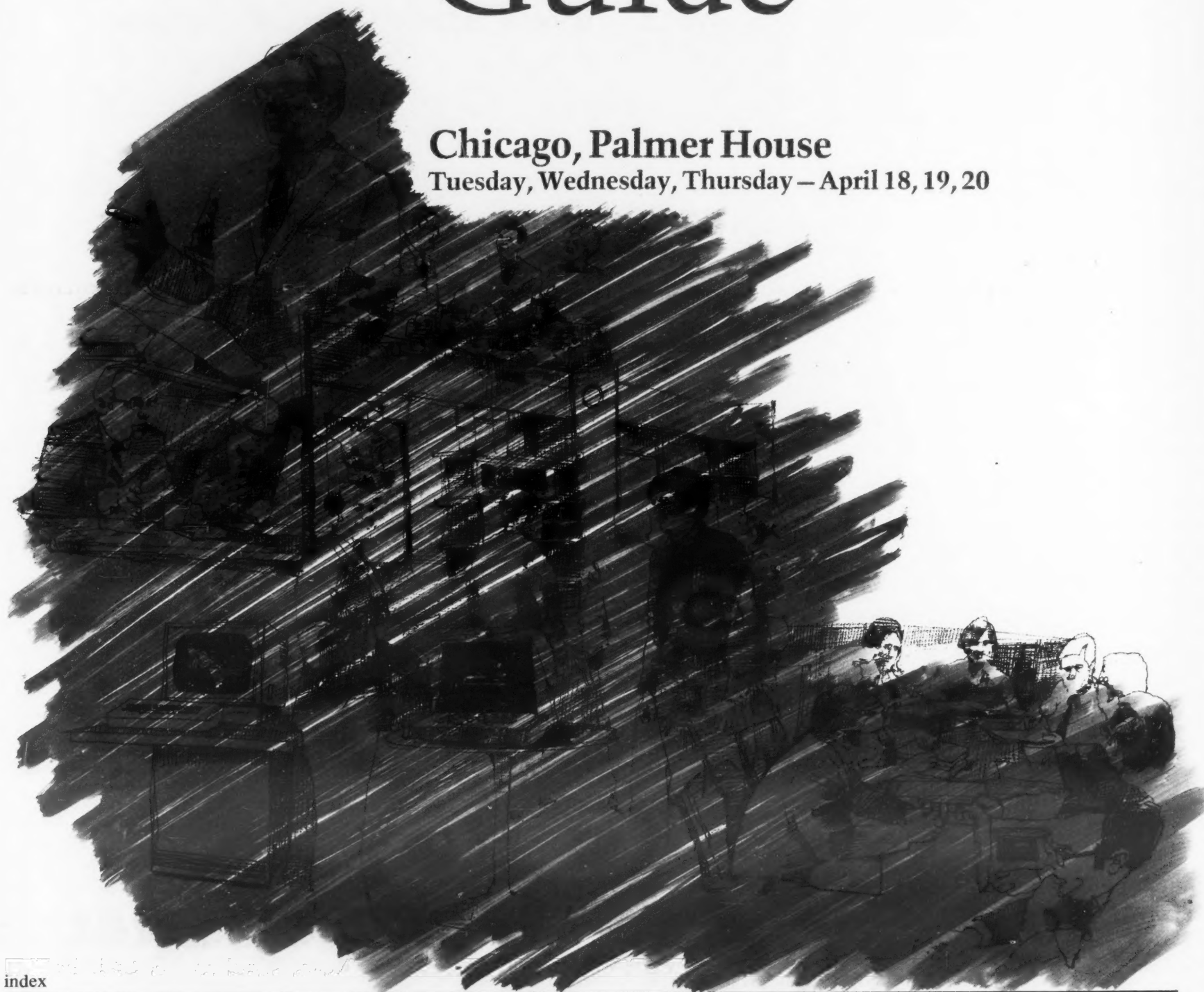


Regional Supplement
to *Computerworld*
April 12, 1972

MIDWEST Computer Users' Forum & Exposition Guide

Chicago, Palmer House

Tuesday, Wednesday, Thursday — April 18, 19, 20



index

Forum Content . . . Page 2

Forum Schedule . . . Page 5

Guide to Exhibits . . . Page 8

Keynote Speeches . . . Page 2

Chance for Betterment

Computer Users Visited by 'Total Conference'

By Edward J. Bride
Forum Coordinator

The total conference for computer users is here!

This first Computer Users' Forum and Exposition has brought together the efforts of EDP managers and practicing professionals to help each other find answers to the problems of the day.

Throughout the exhibit hall and during the forum, the latest technical and management ideas will be probed by experienced users trying to improve the efficiency of their individual operations.

Each morning, a national keynote speaker will review the state-of-the-art, and call users to action in one particular area. The speaker sets the stage for the panel discussion and ensuing workshops.

A dozen management-level users in each city will participate in the panel discussions, four each day. Each day is devoted to a single topic: data entry, communications, and operational efficiency. Each panelist then conducts a workshop, with technical assistance from his own computer installation where appropriate.

The keynote speaker then returns during the luncheon, and summarizes the progress made and knowledge attained by the attendees. After lunch the exhibit hall opens.

Users viewing the equipment exhibits will have a special opportunity to have direct contact with sales representatives and technical experts, without the "emergency" atmosphere that often pervades conversations in the computer room.

In the exhibit hall, users can leisurely "shop" from vendor to vendor, learning of new concepts and equipment — without the pressure of a sales meeting.

Exhibitors know that the effectiveness of most national computer conferences and exhibitions has decreased over the past few years, partly because users are hard-pressed to find travel funds or take time

off to go to conventions. For the exhibitor, the costs are often huge, and the results miniscule. Engineers come to talk to each other and evaluate the competition, all-too-often ignoring the user.

But exhibitors also know that the "payoff end in the computer industry" is the end user, says Patrick J. McGovern, *Computerworld* publisher. He is "neglected and lost in the shuffle" in many larger shows, McGovern believes. While there are some regional, specialized shows, they are bothersome for both user and vendor, and are often too expensive.

The answer, of course, is a traveling show: a Computer Users' Forum and Exposition that brings the computer industry to the user. Our "caravan" will travel to nine cities with a trio of nationally-prominent speakers, a forum organizer, and, of course, the exhibits. We will present to computer users the complete range of alternatives — in equipment, software, and services — needed to solve their information processing requirements.

Hardware, Software

If you think hardware topics dominate our panels and workshops, remember that software problems will be discussed throughout our three-day forum, not just the last day when system software is a specific topic for the "operational efficiency" panel.

Actually, the use of system software modifications and enhancements, and the implementation of commercial or in-house utility routines is just one way a user can control and improve his operational efficiency. The topics on the other two days are both aimed at the common goal on enabling users to improve their operations.

There are software aspects to data entry, particularly with the use of intelligent terminals or with direct data entry. Users with software solutions... and problems... should

plan on attending that half-day session, from the keynote speech and panel discussion, through the workshop conducted by a user most closely-aligned with the attendee's installation.

The same guiding principle can be applied to the data communications session. There may be special software considerations before "throwing out" a carrier's data communications equipment, or the gear made by a user's mainframe maker, in favor of an independent communications supplier. The user with this type of a question can best find the answer in the workshop conducted by the panelist who has used the same type of source for communications equipment.

Likewise, with the transmission

topic. There are applications which are suited to leased-line data transmission more than dial-up usage. Whether the availability of a line, its quality, or the speed of data transmission is the criterion, users can find their hardware, software, or management problems discussed more fully, and can participate more actively, by attending sessions with their "counterparts" from other using organizations.

One of the more exciting panels should be on the last day, when users talk of hardware and software considerations involved in being "innovative." The international background of the speakers and the diversity of subjects will make the final day an especially rewarding experience for attendees.

Speech Synopses Indicate Users Study Top DP Issues

Day One: Data Entry

Lawrence Feidelman says data entry is a system, but many users are presently using first generation data entry techniques for third — or even fourth — generation computer systems.

In his opening day keynote address, he says data entry must be considered as a system because it involves much more than equipment selection. There are personnel considerations, data preparation procedures, forms design, equipment, communications, and computer interface. Data entry, then, must be considered from the point at which data is generated, the source, until it is input into the computer in machine encoded form.

Mr. Feidelman is President of Management Information Corp., Cherry Hill, New Jersey. He recently edited one of the most authoritative books on his assigned topic:

Data Entry Today.

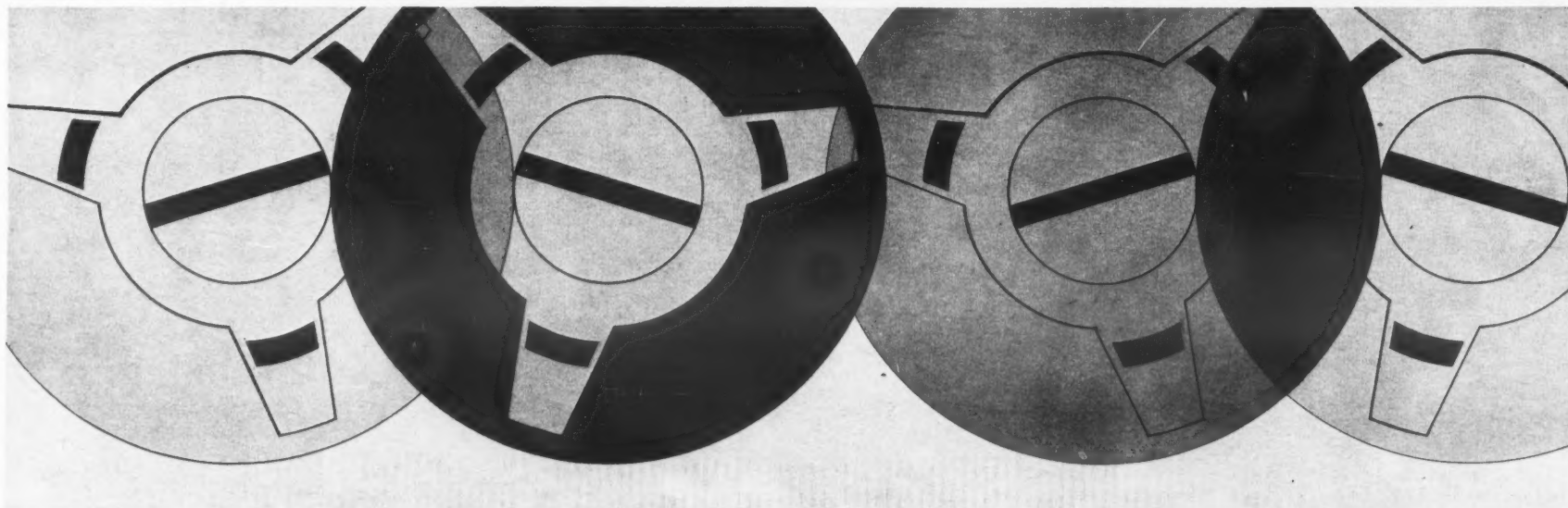
From a systems viewpoint, the keypunch provides a very slow means for data entry, he says. The rigid format is costly, especially when used in multi-keypunch installations, he notes. The keypunch is kept alive by users: ingrained usage of the unit-record concept, ease of data insertion, and personal psychological (resistance to change) reasons are cited in his speech.

There are four variations to keypunch replacement: the stand alone unit, central collection, shared processor, and optical character recognition. The data entry panel separates these topics a little differently, but the concepts will all be discussed, during the speeches, panels, and/or workshops.

Revolutionary Approach

Source Data Automation represents a more revolutionary approach, he noted. With the object

(Continued on Page S/4)



Come play with our Datapoint 2200

When the Computer Caravan hits your city, just drop by.
We've whipped up a little show that proves in a few minutes
how the Datapoint 2200 can cure your
"dispersed data" headaches.

And you'll discover some of the reasons why your present
computer system is somehow just not very efficient.
We'll also show you how the answer isn't a constant
expansion of your home office giant computer. (That's what
you-know-who will try to do.) The little ol' Datapoint 2200
can give your field offices computer capability of their own.



Computer Terminal Corporation

(the people who took the terror
out of computers)

9725 Datapoint Drive
San Antonio, Texas 78229
(512) 696-4520



Keynote Speech Summaries

(Continued from Page S/2) being to capture data at the source or point of generation, eliminating all unnecessary re-transcriptions. The man/machine interface therefore becomes "the critical factor" he notes, whether this involves key entry or automatic readers.

There are some definable factors which hold users back, keeping them away from progress in what is often described as a continuing "bottleneck area."

The apparent stagnant

state of data entry in some users' sites stems from lack of full understanding of new techniques, a resistance to change, a failure of salesmen to emphasize systems concept (rather than just a new piece of equipment), and other factors such as business conditions. The role of data entry technology in the 70s is just one volatile topic of this speech.

The trends of the 70s, including predictions on the use of OCR and point-of-sale terminals, comprise the

last few minutes of this delivery, providing the transition to our panel discussion. The panel discussion begins immediately after the speech, so as to avoid a phenomenon akin to the title of the speech itself: "The Generation Gap Between Data Entry and Data Processing."

Day Two: Data Communications

Dr. Dixon Doll says that one of the major problems for communications-oriented computer users is uncertainty in the regulatory environment, especially re-

garding interconnect and competition among the carriers.

As the second-day keynote speaker in the forum, he lists other problems as both man-caused and technically-abetted. The non-integrated treatment of computer, data processing, and data communications by users and carriers can create problems for communications users, as can the same lack of consistency in solving voice and data communications difficulties.

There is no "full spectrum of alternatives" from car-

riers, he states in his speech, indicating that users may have to change carriers just to take advantage of different solutions to the same problem. The unreliable nature of some existing carrier facilities is a problem to everyday telephone users, but is a special business difficulty for computer users.

In his survey of the current computer communications scene, Dr. Doll, a consultant and Eastern Michigan University educator, discusses common carriers, computer vendors, independent suppliers of equipment, specialized (micro-wave) carriers, regulatory climate and — especially — users.

In summarizing the types of user networks and typical application requirements, he evaluates distributed/centralized networks, urgency of transactions, user requirements in response time, geographical distribution of terminals, and privately-owned/carrier provided links.

"Building Blocks"

Part of every communications system is the equipment, so part of the communications keynote speech is a description of the building blocks used to obtain cost-effective systems. As communications specialists realize — but managers often do not — these building blocks include terminals and modems, multiplexors and concentrators, front end processors, special software, data links, error control devices and techniques, and diagnostics.

With special emphasis on managers, Dr. Doll discusses design alternatives, and the importance of open-mindedness when evaluating the choices. Coping with vested interests of equipment vendors and carriers will be one stumbling block to effective choices, he relates.

Dr. Doll concludes his speech with some hard-headed predictions of what to expect in the area of interconnect rules (will they really be relaxed?), the changes in AT&T's tariff approach, a potentially increased spectrum of service offerings, the centralization of application processing, distribution of communication control functions, and message switching systems.

Enhanced cost control and improved efficiency will be the focal point of the computer-controlled line and

(Continued on Page S/5)

THE WORLD'S FIRST GIRL MINICOMPUTER. SUE.

Here is SUE. The Systems User Engineered minicomputer. We have big plans for SUE. She's going to break the hearts of competitive minicomputer sales types.

She's flexible, responsive, adaptable and nearly ageless. SUE has micro-modularity. All modules...processor cards, memory cards, device controller cards, or whatever...simply attach to the Infibus of a 24-card frame. SUE can meet your systems needs exactly. You never pay for more than you want or have to take less than you need. If your system requirements change, so does SUE. For example, a switch from core memory

to semiconductor memory, or a mix of both, requires only a card change. Now that's flexibility. And responsiveness.

Speed? SUE has a 5-megacycle bandwidth and inherent direct memory access with submicrosecond memories.

The price is equally exciting. A complete 4 K computer for only \$4,295, dropping to less than \$2,600 a unit for 100. That's neither the least nor most expensive version of SUE.

For more information on SUE, ring us up or drop us a line. Call or write: (213) 722-6810...6201 E. Randolph St., Los Angeles, California 90040

Lockheed Electronics
Data Products Division, A Subsidiary
of Lockheed Aircraft Corporation.

(Continued from Page S/4) message-switching portion of the speech.

Day Three:

Operational Efficiency

Charles Lecht, president of Advanced Computer Techniques Corp., New York, says very little work has been done to provide users with a "unified theory" of increasing systems throughput. Lecht is the keynote speaker on the third day of the conference, and his Operational Efficiency speech is entitled "Throughput Revisited."

In his speech, he maintains that the environmental mix of hardware, software, people, and business procedures has been a bit much to cope with, when considered a topic for a throughput study. Indeed, the promise of throughput theory becomes increasingly remote as hardware, software, and personnel environments become increasingly sophisticated, he says.

After looking at the state of the art today, particularly from a user's viewpoint, Lecht asks some pointed questions of his audiences, one which may provide stimulated discussion: Is it true that systems being supplied to the user today justly deserve representation as being advanced, highly sophisticated and very powerful if these same systems have served to decay throughput predictability?

He suggests our admiration for today's engineering sophistication of computer systems has masked the fact that, as this sophistication has increased, it carried along in its genes even more sophisticated growth stages of "the seed of throughput unpredictability" initially sown by engineers "whose technological preoccupations far exceeded" their interest in the end use of their inventions... the "why" and "what for."

"Apologize"

Could it be that we owe an apology to these engineers, because we just haven't really worked hard enough to solve the problems of throughput predictability?

In addressing this possibility, Lecht said users must

consider hardware, software, personnel, and procedural sub-environments, as well as the symbiotic unions.

With a flair for public speaking, which is familiar to many computer society members, Lecht reminds users that coexisting with our quest for operational efficiencies and throughput predictabilities must be our dedication to the principle that "human engineering" is preferable to the "engineering of humans."

DAILY SCHEDULE

8:00 a.m.: Registration
9:00 a.m.: Welcome, keynote address
9:40 a.m.: Panel discussions, general questions
10:40 a.m.: Workshops, specific questions
12:15 p.m.: Lunch
1:00 p.m. - 7:30 p.m.: Exhibits open

The Computer Users' Forum and Exposition will follow the same schedule in each of the nine cities.

TOPICS

First Day: Data Entry (keypunch replacement, OCR, intelligent terminals, direct data entry).

Second Day: Communications (equipment sources: mainframe makers, carriers, independent suppliers; transmission: private, carrier nets).

Third Day: Operational Efficiency (core extensions, software, independent peripherals, dedicated vs. general purpose systems).

Need a remedy for data communication headaches?



Try our permanent cure.

If keeping your data communication system on line is becoming a headache, don't live with it. ICC can cure it. Permanently.

The ICC cure starts with tested, field-proven modems that operate reliably where ordinary data sets have problems. Then we offer professional installation, training of your personnel, prompt field service, and continuing support to keep your system operating.

With ICC, you won't just lose a headache. You'll gain new confidence in your data communication.

Send for a copy of our product catalog.

ICC

International Communications Corporation

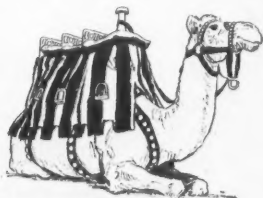
7620 N.W. 36th Avenue, Miami, Florida 33147

Telephone 305 + 691-1220

In Europe: RACAL-MILGO LIMITED Reading, Berks, England

a milgo company

1971



CW Forum and Exposition

People Meeting People...



Panelists describe their own operations before answering questions from forum participants.



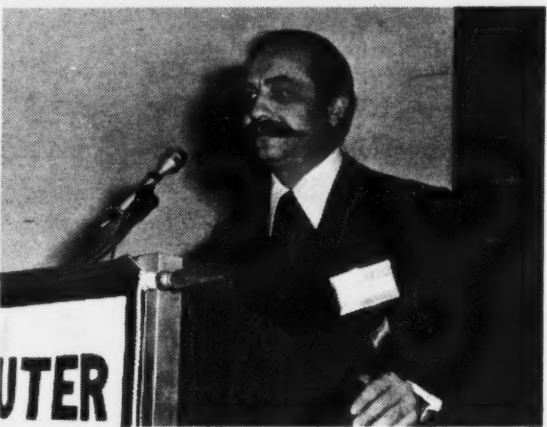
Panelist Robert Chernis of Lumber Mutual Fire Insurance leads a workshop on intelligent terminals.



Lawrence Feidelman discusses data entry.



Dixon Doll answers questions on data communications.



Charles Lecht makes a point on operational efficiency.

Homework Vital to Good Data Entry

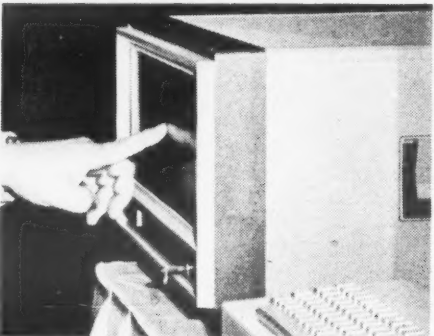
...And the Machines



Graham Magnetics illustrates Epoch-4 tape toughness and graphs the stress strain curve on samples.



Cartridge disks are loaded into Iomec's Iodisc Series One data storage system.



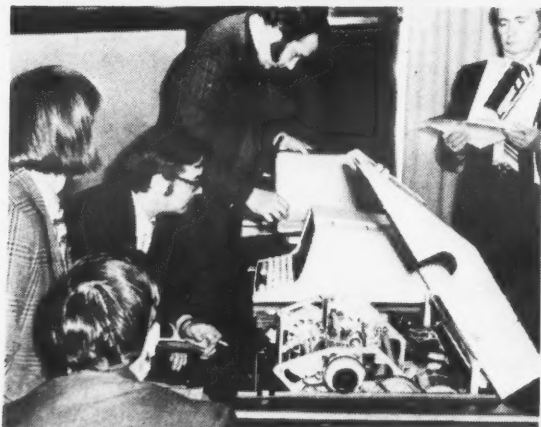
No buttons, no switches are visible on the Lockheed Sue Minicomputer. Microflex switches and light-emitting diodes are hidden behind the flexible plastic front panel.



Users try out Interdata's Series 70 processor.



Calcomp demonstrates its new 1040 magnetic tape system that is plug-to-plug compatible for the 360/370 CPUs.



Computer Terminal Corp. exhibitors meet some users who "want to see the works."

★ CW Photo Feature ★
By V.J. Farmer

COMPUTER USERS' FORUM AND EXPOSITION

Panel and Workshop Topics

DATA ENTRY*First Day*

Keypunch Replacement.

OCR.

Intelligent Terminals.

Direct Data Entry.

DATA COMMUNICATIONS*Second Day*Data Communications Equipment Sources
(mainframe makers and/or common carriers).Data Communications Equipment Sources
(independent suppliers).

Data Transmission by Private (leased line) Networks.

Data Transmission by carrier (dial-up) networks.

OPERATIONAL EFFICIENCY*Third Day*

Core Extensions.

System/utility Software Modifications and Enhancements.

Independent Peripherals.

Dedicated systems vs. General Purpose Computers.

The regional forums and workshops will be headed by local experts in the fields covered. A listing of leaders and panelists will be available at the Registration Desk.

COMPUTER CARAVAN STAFF

President Patrick J. McGovern
 General Manager H.G. "Charlie" Asmus
 Technical Direction Dick Bautz
 Forum Direction Robert M. Patterson
 Forum Coordination Edward J. Bride
 Exhibits Neal Wilder, Dottie Travis
 Attendance Coordination W. Walter Boyd

Societies Helped, Now Gain from DP Forum

Several professional computer societies have contributed to the success of the forum by suggesting innovative users to serve as panelists and by publishing our schedules and formats in member newsletters.

Some of these societies will be exhibiting member publications in the lobby, along with "recruiting" materials. While not all societies have chapters in all cities, and while it was not possible to contact every individual chapter of every organization, the availability of these facilities was published in *Computerworld*, and was extended to societies on inquiry.

Local chapters in some cities may hold special, regular, or even "organizational" meetings in rooms provided at no expense to them. Those which have indicated an in-

terest in these facilities, in at least some of the nine cities, are as follows:

Association for Computing Machinery

Association of Computer Programmers and Analysts

Association for Systems Management

Data Processing Management Association

Society of Certified Data Processors

Local participation, when made known to forum officials sufficiently early, is being posted in appropriate entrance areas. If there is a question about the use of facilities or plans for meetings, check with your group's information table in the lobby, or call your local/regional representative.

Your presence at this forum and exposition attests to the interest of the computer community in participating in a meeting with a format tailored for you — the end user. We trust that you will find the experience a valuable one, and that our program meets your expectations.

The exhibiting family welcomes the opportunity to talk with you about your problems, and explore their solutions with you. The personnel staffing the exhibits are local people who, in turn, can continue a dialogue with you after the "caravan" departs. We feel that this element of our program should be of continuing benefit to all.

Several of our exhibitors have organized more detailed presentations of their problem solutions, and a schedule of their special meetings is posted in the Registration Lobby and on the exposition floor. We urge you to take advantage of their programs.

We welcome your comments on those aspects of the Computer Users' Forum and Exposition which you find beneficial, and also what you might like to see modified or improved in future events of this nature.

The staff and committees have worked long but enjoyable hours, organizing and bringing this conference to you, and we hope you share with us the satisfaction in having filled a long-time void in convention planning: a limited but hard-hitting technical program on current user topics, combined with a relevant exhibition . . . all brought directly to you, the computer user.

H.G. Asmus
General Manager

MAY WE DOT YOU?

We've got dots in New Jersey, California, Texas, Kansas, Louisiana, Massachusetts. Dots for Seattle, Chicago, Dallas, Detroit.

Wherever you are, whenever you need computer services, the BCS dot nearest you will put you in touch with our comprehensive service network. When the eleventh hour arrives, we'll be there. (On the dot.)

BCS

BOSTON COMPUTER SERVICES, INC.

CORPORATE OFFICES EAST (201) 361-2121. WEST (206) 773-6161

The following is a listing of Computer Caravan exhibitors, as of press time. Consult the Addendum Sheet for additions.

APPLIED DATA RESEARCH, INC.

Route 206 Center
Princeton, N.J. 08540
Tel: (609) 921-8550
Booth No.212

ADR's 6 proprietary software packages provide both management and programmers with unique programming aids which increase the effectiveness and efficiency of data processing installations. These packages are: 1) MetaCOBOL, a COBOL Pre-processor for COBOL conversion, COBOL program preparation, testing, monitoring and evaluation, 2) AUTOFLOW, a patented debugging and documentation system, 3) The LIBRARIAN, a source program maintenance and retrieval system, 4) ROSCOE, a conversational on-line program test system and remote job entry system, 5) SAM, a software and hardware simulator, 6) PI SORT, a DOS plug-compatible sort that is faster than IBM's 450 and 483 sorts.

BOEING COMPUTER SERVICES, INC.

P.O. Box 708
Dover, N.J. 07801
Tel: (201) 361-2121
Booth No.208

Boeing Computer Services, Inc., offers computing time programming, consulting, training, data base services and other computer oriented services.

BCS, a subsidiary of The Boeing Company, operates throughout the United States and maintains data centers in Philadelphia, Wichita, Huntsville, and Seattle.

On-line demonstrations of widely accepted applications: general business, financial, or management systems... manufacturing, engineering, or scientific techniques... inventory management... computer operating systems. Visit with BCS. Personal attention now — and later.

CALIFORNIA COMPUTER PRODUCTS, INC.

2411 West La Palma Avenue
Anaheim, CA. 92801
Tel: (714) 821-2731
Booth No's.301-303

GRAPHIC OUTPUT SYSTEM-900/1136

A complete, high-performance off-line plotting system; the CalComp Graphic Output System — 900/1136 is composed of a Model 900 Controller, a Model 937 Magnetic Tape Unit and a Model 1136 Digital Incremental Plotter.

1040 MAGNETIC TAPE SYSTEM

An ultra-high performance magnet-

ic tape system, the CalComp 1040 System has been designed for plug-to-plug compatible use with all System 360 and System 370 tape drive systems. The 1040 System is made up of a Model 1040 Controller and up to eight Model 345 and 347 Magnetic Tape Units.

1015A DUAL DENSITY DISK STORAGE SYSTEM

The CalComp 1015A System is a high capacity direct access storage system which interfaces directly to the selector channel of System 360/30 (and higher) and System 370 computers. The 1015A is a direct replacement for the IBM 2314B and features storage at a far lower cost per bit and with less storage space.

CENTRONICS DATA COMPUTER CORPORATION

One Wall Street
Hudson, NH 03051
Tel: (603) 883-0111
Booth No.206

Model 101 and 101A Printer, and Model 401 CRT.

COMPUTER TERMINAL CORPORATION

9725 Datapoint Drive
San Antonio, Texas 78229
Tel: (512) 696-4520
Booth No.109

The Datapoint 2200, a computer

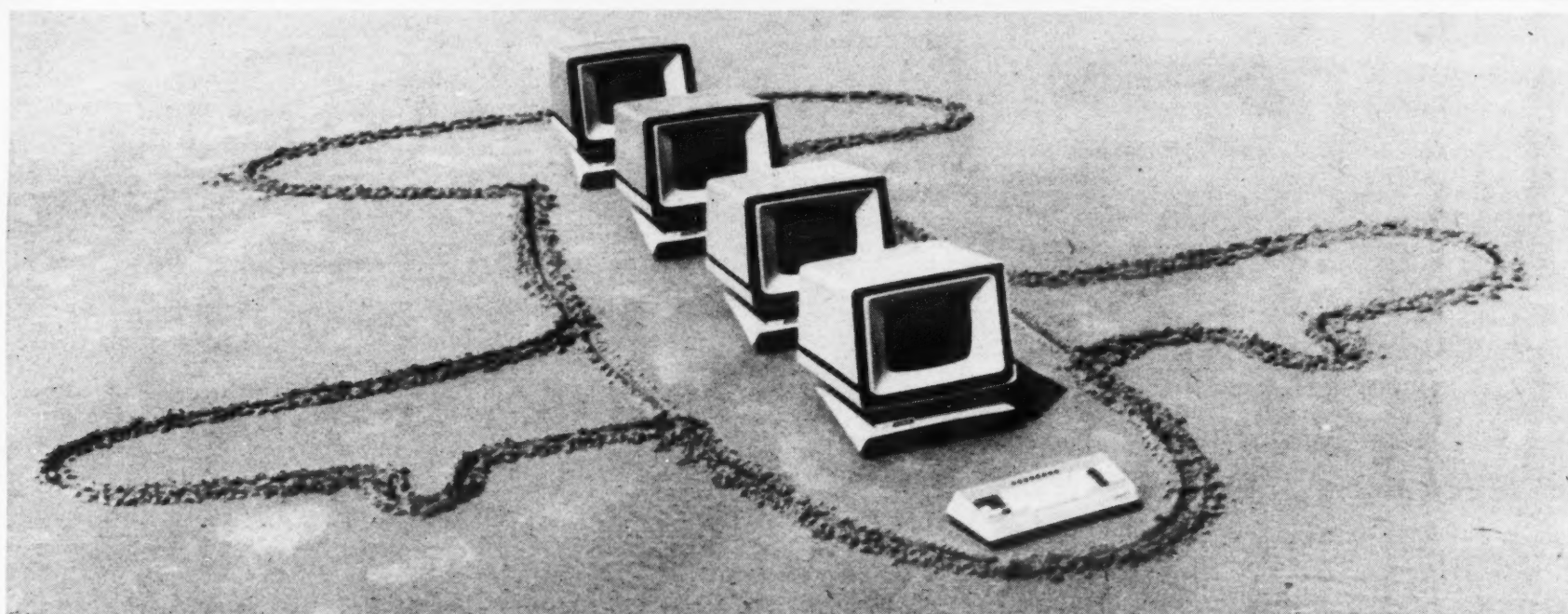
based display terminal, containing 2 cassette tapes, is an ideal system for applications in remote source data entry and as a stand alone small computer. Also on display are the 2200/Tape, a 9 channel industry compatible mag tape transport, the 2200/Printer a 30 cps., 132 column impact printer. A full range of services are also provided, including Business and Communications software.

COMPAT CORPORATION

Subsidiary of DATA 100
177 Cantiague Rock Road
Westbury, New York 11590
Tel: (516) 822-1320
Booth No.406

Model 78 Programmed Terminal — Programmed processor that may be configured with card reader, punches, printers, paper tape, magnetic tape, plotters, CRT's and TTY's. Software offers a wide variety of field proven synchronous and asynchronous line disciplines such as IBM 360/20 and 2780; Univac 1004, DCT 2000 and 9000; and CDC 200 UT.

Compat 88-23 Batch Data Terminal — stored program processor for information accumulation and communication. Features anytime editing; flexible format control; 64,000 character data storage. Peripherals include typewriter, line printer, paper tape, magnetic tape.



Ends Future Shock


The world changes. So will your business. So should your terminal.

INCOTERM's customers... airlines, banks, hospitals... will discover a future free of the usual shock; you can, too. Meet the system demands of a new generation of computers... the operational demands of a new breed of businessman... with quick, inexpensive program changes at an "intelligent" terminal. Never any hardware or central site obsolescence. That's why over a thousand INCOTERM displays are at work today.

Operators change functions, even keyboard layouts, at the touch of a button. Your terminal system changes itself as your business changes.

Unique features, too. Like the ability to communicate with several computers or networks at once. Or to talk to other terminals independent of a central computer. Or to share memory with other terminals in the network.

Tomorrow is flying your way rapidly. Consider that when you select a terminal for today. Consider the "intelligent" alternative.



... the international computer terminals people

6 Strathmore Road / Natick, Massachusetts 01760

Tel: (617) 656-6100

In Chicago see Jim Beckman — Western Regional Manager — or call (312) 593-2230

Get Epoch 4



and get rich slow.

Epoch 4 computer tape won't make you rich overnight. But it can put real money in your pocket, day after day. Here's how:

Epoch 4 is 80 times tougher than competitive tapes. And it cuts handling damage by about 50 per cent. So Epoch 4 lasts one heck of a lot longer. Which means extra money in your pocket (or your budget, as the case may be).

As an extra dividend, Epoch 4's headwear rate is just 4 per cent of the industry average.

And if that's not impressive enough, think about this—Epoch 4 is the world's only computer tape with a twenty year warranty.

Sure, Epoch 4 costs a little more to start with. But put the pencil to it. How much is your data worth? What does it cost to recover lost information?

A really great tape just could be the best investment you've ever made.

Quick, see your man from Graham Magnetix about Epoch 4. And start getting rich.

 **GRAHAM
MAGNETICS**

GRAHAM, TEXAS 76046

CalComp unpacks in Chicago on April 18.

Come see us. We're a big part of the Computer Caravan. Here's what we'll be unpacking for the show:

Dual Density Disk Systems.

They store more than IBM's. We lease for less, too.

Plotter Systems.

We taught the computer to draw. We've been learning new applications ever since.

Tape Systems.

Our newest addition. It's plug-compatible with IBM.

We'd like to meet you. We'd like you to come to our seminar. We'd like to help you in three different ways.



DATA 100 CORPORATION
7725 Washington Avenue, South
Minneapolis, Mn. 55435
Tel: (612) 941-6500
Booth No.'s 406-407

Model 78 Programmed Terminal — Programmed processor that may be configured with card reader, punches, printers, paper tape, magnetic tape, plotters, CRT's and TTY's. Software offers a wide variety of field proven synchronous and asynchronous line disciplines such as IBM 360/20 and 2780; Univac 1004, DCT 2000 and 9000; and CDC 200 UT.

Compat 88-23 Batch Data Terminal — stored program processor for information accumulation and communication. Features anytime editing; flexible format control; 64,000 character data storage. Peripherals include typewriter, line printer, paper tape, magnetic tape.

DIGITRONICS CORPORATION
1 Albertson Avenue
Albertson, N.Y. 11507
Tel: (516) 484-1000
Booth No. 218

Digitronics will show on the Computer Caravan its Model 200 Line Printer and Series 1600 Magnetic Tape Transport. This equipment, now available with plug-to-plug interfaces for a wide variety of minicomputers.

The Model 200 Line Printer features print quality equal to that of printers selling for more than 4 times its price, a swinging yoke for easy paper loading, a flexible font belt, universal multi-font buffer, and 8-channel, vertical format unit. It operates at 200 LPM with a 64 character font.

The 1600 Series consists of 12 different configurations of IBM-compatible magnetic tape transports all having these unique features: a unique leader clamp system that simplifies threading and prevents tape spilling, easy snap-on, snap-off reel loading and the latest in servo technology for positive tape control.

EASTMAN KODAK COMPANY
Business Systems Markets Division
343 State Street
Rochester, NY 14650
Tel: (716) 724-4539
Booth No.'s 213-214

Eastman Kodak will show how KODAK COM Systems contribute to Computer Output Management. Also shown will be the Hewlett-Packard Magnetic Tape Reformatting System which provides an interface to Kodak KOM Microfilmers, expanding the utility and convenience of COM systems for DP personnel. Featured are integral 7/9 switchable tape drive, 200 to 1600

BPI selection, a main frame with 4K 16-bit words and expandable core, and multiple I/O options. Software supports basic printer formats and Kodak KOM Microfilmer native mode.

GRAHAM MAGNETICS INCORPORATED
Graham
Texas, 76046
Tel: (817) 549-4500
Booth No. 207

Epoch-4, the world's first permanent computer tape, will be demonstrated in a "free film" form, dramatically illustrating its toughness in contrast to competitive binder systems. A highly sensitive Instron

tester will be shown pulling free film samples while graphing the stress strain curve. As a result, the ability of the coating to withstand physical punishment and abuse is presented in precise engineering parameters.

HAZELTINE CORPORATION
Greenlawn
New York 11740
Tel: (516) 549-8800
Booth No.'s 404-405

Hazeltine 2000 Video Display Terminal, featuring a fully-buffered 1,998 character display, switch-selectable transmission rates to 9,600 bps and higher, split-screen, format capability, automatic tabulation, variable field transmission, complete editing capability, direct

cursor addressability, automatic or selective scrolling, protected data, remote keyboard.

Hazeltine "Dual" Tape Cassette Units, operable under operator or CPU control. Each of two cassette drives stores 150,000 characters. Operates in either paper tape emulation mode or batch mode at speeds up to 1,200 baud. Hazeltine Printer Unit — silent, 30 characters per second.

HEWLETT PACKARD COMPANY
1100 Wolfe Road
Cupertino, CA. 95014
Tel: (408) 257-7000
Booth No.'s 308-310

Hewlett Packard Company Data Products Group cordially invites you to visit our booth. On display

The first compact data storage system to combine tape economy with disc performance.

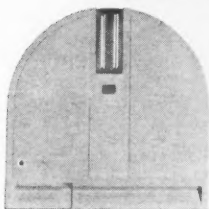
IODISC series one is new. Low in cost. Extremely high in performance. And remarkably compact. Using a small, two-megabit "cartridisc" cartridge (containing a low cost, flexible disc), the series one disc systems offer all of the advantages of non-contact, flying head recording at a cost comparable to slower tape cassette systems. Series one technical features are impressive. An average access time of 60 ms. Data transfer rate of 1.2 megabits per second. And start and stop times of 3 seconds. The series one module with dual drive, either desk top console or rack mounted, is only 7 x 19 x 23 inches.

Series one is available as a complete data storage system interfaced to most minicomputers, or as separate OEM components. IODISC series one is the first very small data storage system to offer high performance, fast random access, versatile I/O and outstanding reliability. Write or call us for full information. Iomec Inc., 345 Mathew Street, Santa Clara, California 95050. (408) 246-2950.

Iomec Inc



IODISC SERIES ONE



is our 2120-A Disc Operating System, the 2100-A minicomputer featuring the new Writable Control Store option, graphic plotters, optical mark sense card readers and calculator systems.

INCOTERM CORPORATION
Six Strathmore Road
Natick, MA. 01760
Tel: (617) 655-6100
Booth No.'s 204-205

INCOTERM will exhibit the SPD 10/20, Stored Program Display and peripheral devices including the SPD-T Tape Cassette Transport and SPD-P-165 Printer.

The SPD 10/20 contains a minicomputer built right into the display cabinet. The characteristics of the SPD 10/20 will be changed in a

matter of seconds to demonstrate the flexibility of the device. The SPD 10/20 is in production. We can deliver today to satisfy your present requirements. What we deliver today can be easily adapted, through software, to fulfill tomorrow's needs.

INTERDATA, INC.
Two Crescent Place
Oceanport, N.J. 07757
Tel: (201) 229-4040
Booth No.'s 306-307

Interdata will exhibit several members of its New Series of processors which includes the Models 70 and 80, general purpose machines; and the Models 50 and 55, special purpose data communications processors. The fastest member of the

New Series, the Model 80 features 240 nanosecond semi-conductor main memory. All processors are available with complete software packages and a full line of peripherals.

INTERNATIONAL COMMUNICATIONS CORPORATION
A Milgo Company
7620 N.W. 36th Avenue
Miami, Florida 33147
Tel: (305) 691-1220
Booth No. 217

International Communications Corporation will display a complete line of data communication products, featuring high-speed modems for data transmission over dial-up phone lines or leased data lines. The ICC display will also include data

communication test equipment and accessories. Experienced personnel will be in attendance for consultation.

IOMEC, INC.
345 Mathew Street
Santa Clara, CA. 95050
Tel: (408) 246-2950
Booth No. 305

I/O Disc Series One, the first compact data storage system to combine tape economy with disc performance, will be introduced by IOMEC, Inc. The system is a compact disk drive using an eight inch "Cartridisk" cartridge containing an inexpensive flexible disc with 250 K byte capacity. The compact Series One desk top console, with dual drives, measures seven inches by nineteen inches by twenty-three inches. Series One is available as a complete data storage system interfaced to most minicomputers, or as separate OEM components.

ITEL CORPORATION
One Embarcadero Center
San Francisco, CA. 94111
Tel: (415) 989-4220
Booth No. 215

Featured at ITEL's booth are two new IBM System/370 plug-to-plug compatible products: Monolithic Main Memory and 7330 Disk Drives. The Monolithic Memory (manufactured by Advanced Memory Systems, Inc.) handles all size changes and can be leased or purchased. The 7330 Disk Drive utilizes a single spindle to store 100,000,000 bytes per drive with an average access time of 27 milliseconds. The new drives are manufactured by ITEL's Information Storage System Division.

LOCKHEED ELECTRONICS COMPANY, INC.
Data Products Division
6201 East Randolph Street
Los Angeles, CA. 90040
Tel: (213) 722-6810
Booth No. 101

NEW PRODUCT INTRODUCTION: SUE, the System-User-Engineered minicomputer, features micromodularity. From a set of independent modules and peripherals SUE can be assembled in nearly endless configurations to offer maximum price/performance for the application. A wide-bandwidth common bus architecture is ideal for high-throughput applications. Highly competitive multi-unit pricing. Lockheed Data Products also announces the MM-365 replacement memory for large-scale IBM System 360 as well as several low-cost, high-speed commercial core memories. All types of complex multi-layer printed circuit boards are manufactured by the company.

Tom Watson presents our newest way to reduce time-sharing costs.

"He's in charge of our new EDT-300 terminal and he doesn't work for IBM."

Z. V. Zakarian, president
Western Union
Data Services Company.



Our new 30 c.p.s. data terminal cuts in half the cost of computer connect time, compared to 10 c.p.s. terminals.

It leases for as little as \$125 a month. (You can figure out how much you'll save on your monthly time-sharing bill.)

This high-speed terminal can also reduce your telephone line costs, not to mention freeing up needed lines.

Minor advantage: it is a very quiet machine.

The EDT-300 was developed by General Electric working with Western Union Data Services Company. The objective was reliability. (After all, maintenance is our responsibility.)

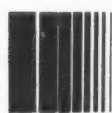
The objective has been realized. This is

the most reliable 30 c.p.s. electronic printer available. But since we have yet to achieve perfection, it's backed by Termicare™ our free nationwide repair service for all our terminals.

There are two EDT-300 models. One is acoustic-coupled with either originate-answer or originate-only modems. The other is originate-only to work with data access arrangements.

And of course we still offer our range of Model 33 and 35 data terminals.

For information call our Tom Watson toll free at 800-631-7050 (in New Jersey 201-529-1170). Or write him at Western Union Data Services Company, 16 McKee Drive, Mahwah, N.J. 07430.



data services company

MILGO ELECTRONIC CORPORATION (ICC)
7620 N.W. 36th Avenue
Miami, Florida 33147
Tel: (305) 691-1220
Booth No.217

International Communications Corporation (A Milgo Company) will display a complete line of data communications products, featuring high-speed modems for data transmission over dial-up phone lines or leased data lines. The ICC display will also include data communication test equipment and accessories. Experienced personnel will be in attendance for consultation.

NASHUA CORPORATION
44 Franklin Street
Nashua, NH 03060
Tel: (603) 883-7711
Booth No.403

Nashua Corporation of Nashua, New Hampshire displaying its complete line of disc packs and disc cartridges for computers, including computer magnetic tape.

Display to include: 4406 Disc Pack (IBM 1316 Compatible), 4411 Disc Pack (IBM 2316 Compatible), H411 Disc Pack (Honeywell 273, 274 Compatible), 4415 Disc Cartridge (IBM 2315 Compatible), 4440 Disc Cartridge (IBM 5440 Compatible), 4436 Disc Pack (IBM 3336 Compatible), Computer Tapes.

Nashua's newest disc pack, the 4436, (IBM 3336 Compatible) stores in excess of 100,000,000 Bytes of data. Don't miss seeing this disc pack!

NOVAR CORPORATION
2370 Charleston Road
Mountain View, CA. 94040
Tel: (415) 964-3900
Booth No.203

Novar' terminals and telecommunication systems, including auxiliary devices.

SANDERS DATA SYSTEMS, INC.
95 Canal Street
Nashua, NH 03060
Tel: (603) 885-4208
Booth No.'s201-202

Sanders Data Systems, Inc. will exhibit the System 804 Stand-Alone model of Sanders' Series 800 Programmable Terminal Systems. The complete product line of peripherals, excluding disk, will be shown in operation. Two printers, (one high speed - 300 LPM and one low speed - 30 CPS), a tape cassette for loading programs and retrieval and storage of data and a 300 CPM card reader for loading programs or data. One 804 will be used primarily for the demonstration of local data entry, retrieval and storage. The other 804 will demonstrate the programmability of the terminal by showing a variety of programs including data product emulation.

SYCOR, INC.
100 Phoenix Drive
Ann Arbor, Michigan 48104
(313) 971-0900
Booth No.'s105-106

Sycor will display its System 20 - a complete data entry and communications system for branch offices. The System 20 incorporates a Model 340 Intelligent Terminal with 12 K bytes of memory, 1,000 cps, cassette recorders, 1200-2400 baud BSC communications, and a 30 cps impact printer. Sycor also will feature its System 40 - the first cassette terminal with HASP compatibility. The System 40 is composed of a Model 340 Intelligent Terminal, 12 K bytes of memory, 2,000-2,400 baud BSC communications, a 250 cpm card read-

er, and a 200 lpm line printer. Sycor provided software can be executed from either system.

TALLY CORPORATION
8301 South 180th Street
Kent, WN 98031
Tel: (206) 251-5625
Booth No.'s210-211

The Tally DATASCRIBE product line on exhibit is a data preparation and batch terminal system with outstanding configuration flexibility for handling varied data volumes and application requirements. The user has a choice of peripherals for remote batch applications including punched card and paper tape, and either 600 lpm or 100 lpm output printers. The new Tally 100 lpm

impact printer on display is also available as a free-standing receive-only terminal for remote printing in a 1200 baud network.

TECHTRAN INDUSTRIES, INC.
580 Jefferson Road
Rochester, NY 14623
Tel: (716) 271-7953
Booth No209

4100 Communications Terminal - operator oriented Cassette data terminals featuring 110-2400 baud speeds, TTY & RS-232 Interfaces, High Speed Search, Full Remote Control, Data Edit, Switch Selectable On-line/Off-line capability and both USASCII Coded & IBM 2741 Compatible models. Plugs into most data terminals and mini-computers.

Here's What DATA 100 Is Doing For Over 700 Terminal Users Today...

DATA 100 Model 78, Model 70, and Model 88-23 Terminals are at work right now saving users money and speeding up data communications in talking with 360's, 370's, 6600's, 1108, and Spectras throughout the world. DATA 100, the leading supplier of plug-in replacement Batch Terminals, offers the following products:

Model 70 Remote Batch Terminal truly plug-compatible with 2780 featuring—

- Faster throughput on lines up to 9600 BPS.
- Selection of following peripherals: 300 & 600 CPM card readers, 300, 400, 600 LPM line printers, card punch.
- 15% to 30% savings in monthly rental.

Model 78 Programmed Batch Terminal, plug compatible with 360/20 featuring—

- Simulation of 2780, 1004, DCT 2000, and 200 UT Terminals.
- All Model 70 peripherals plus magnetic tape, paper tape, CRT's and TTY's.
- Capability to concentrate data input from low speed terminals for high speed transmission to central computer.
- 30% to 50% savings in monthly rentals.
- Interleaving data transmission.
- Magnetic tape applications to fit your requirements.

Compat Model 88-23 family of Data Entry Terminals that—

- Validate input data at source and transmit directly to 360/370 central computer.
- Offers optional central off-line pooling of remote data entry terminals, thus freeing CPU of communications processing.
- Offers application software for order processing, billing, inventory control, and many others.

Find out today what DATA 100 can do for you to help solve your data communications problems with quality products, on-time delivery, and competitive pricing—all backed up with an established sales and service organization.

DATA 100 CORPORATION

MIDWEST:
Minneapolis, MN 612/941-6500
Chicago, IL 312/992-0850
Detroit, MI 313/642-3383
Lansing, MI 517/489-1700
St. Louis, MO 314/878-4911
Dallas, TX 214/638-7946
Houston, TX 713/772-2483
Dayton, OH 513/278-6723

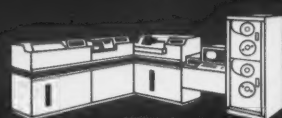
SOUTHEASTERN:
Washington, DC 703/893-4356
Nashville, TN 615/329-3699
Greensboro, NC 919/273-6789
Raleigh, NC 919/782-2185
Atlanta, GA 404/432-7791

WESTERN:
Los Angeles, CA 213/645-4300
Palo Alto, CA 415/328-2100
Seattle, WA 206/228-4770

EASTERN:
New York, NY 212/868-7590
Nutley, NJ 201/667-2960
Philadelphia, PA 215/643-7677
Pittsburgh, PA 412/833-3633
Boston, MA 617/749-2683
Buffalo, NY 716/691-6036
Hartford, CT 203/525-7701

CANADIAN:
Montreal, Quebec 514/842-1721
Toronto, Ontario 416/447-6413

ENGLAND:
Watford, Herts Watford 39611
Hemel Hempstead, Herts
Hemel Hempstead 61711
Poynton, Cheshire Poynton 2129



THE SEVENTY SERIES



ASK ABOUT OUR LATEST ADDITION
COMPAT 88-23

TEKTRONIX, INC.
Box 500
Beaverton, Oregon 97005
Tel: (503) 644-0161
Booth No.410

The 4010 Computer Display Terminal and Plot-10 software opens the door for the potential user who has avoided graphic terminals because of the high cost of hardware, software development and computer overhead. The 4010 is now hardware and software compatible with over twenty timesharing systems, with IBM 360/370 systems, and a host of many computers. Price: \$3,950.00.

The 4610 Hard Copy Unit provides permanent copies of the alphanumeric and graphics displayed on the 4010-1 Computer Display Terminal. Copy medium is 3M type

777 Dry-Silver paper and copy size is 8-1/2 X 11 inches. Price: \$3,550.00

TEXAS INSTRUMENTS INCORPORATED
P. O. Box 1444
Houston, Texas 77001
Tel: (713) 494-5115
Booth No.107

Texas Instruments personnel will display and demonstrate the new, Model 960A minicomputer — the \$2,850 price/performance leader; and the 30 character-per-second, "Silent 700*" Electronic Data Terminals — the quiet, versatile and reliable teleprinters.

*Trademark of Texas Instruments Incorporated.

TRENDATA COMPUTER SYSTEMS CORPORATION
585 North Pastoria
Sunnyvale, CA. 94086
Tel: (408) 732-1790
Booth No.104

TRENDATA offers a complete line of equipment for data communications and source data collection up to 1200 baud. These include IBM compatible selectric typewriter terminals for 2741 or 2740-1 software environments and a set of Bell and IBM compatible modems and acoustic couplers.

A unique new terminal includes magnetic tape cassette storage with extensive off-line editing and formatting capability and high speed transmission. Other new products include a 100 lpm impact terminal

and a tape "pooler" for collecting data off-line for batch entry.

VARIAN DATA MACHINES
2722 Michelson Drive
Irvine, CA. 92664
(714) 833-2400
Booth No.'s102-103

620/f with VORTEX, Varian's real time operating system that beats far more expensive systems. FORTRAN IV compilations in background. Look into your future with Operation Aquarius in foreground. STATUS 21: prints your personal horoscope. We've tied out STATUS 21 printer/plotter on-line to the 620f with VORTEX to let you write in your name, address and birth date and get your horoscope complete with plot of your birth sign printed at 5,000 lines or 60 pages of graphics per minute.

ADAPTS: Plugged-in computer experience. ADAPTS will control experiments, handle files, process data. Loads of hook-ups; easy to change and program.

VERSATEC, INC.
10100 Bubb Road
Cupertino, CA. 95014
Tel: (408) 257-9900
Booth No.304

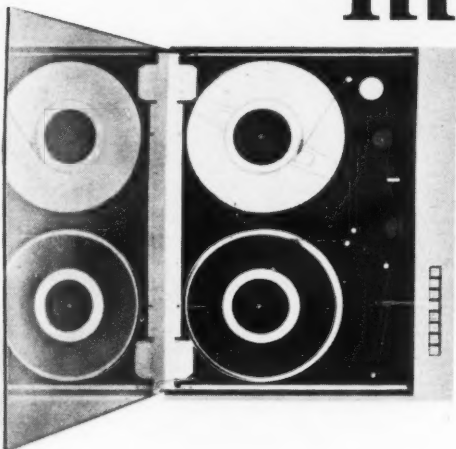
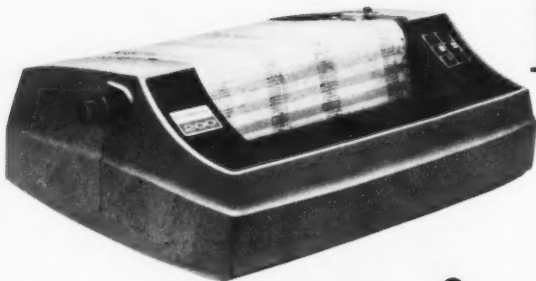
Active demonstration of Matrix 1100A & Matrix 200A Printer/Plotters showing both graphics and printing capability. The Matrix 1100A prints 132 columns of 7x9 dot matrix, upper and lower case characters at speeds up to 500 LPM. It plots with 1024 nibs on 11" wide fan-fold and roll paper. The Matrix 200A prints 80 columns at speeds up to 600 LPM and plots with 560 nibs using 8-1/2" wide fan-fold and roll paper. Also on display is a variety of controllers for Matrix products and various mini computers.

WESTERN UNION DATA SERVICES
16 McKee Drive
Mahwah, N.J. 07430
Tel: (201) 529-1170
Booth No.401

Western Union Data Services Company is a national organization, providing data communications systems and terminals as well as applications analysis and support.

The purpose of the Data Services Company is to help you solve your data handling problems by providing a source for system engineering, data terminals, nation-wide training, service and support. New products and services are being developed to assure you a continuing source of solutions for the future. On exhibit will be our new 30 C.P.S. Data Terminal and the 10 C.P.S. Exchange Data Terminal 33.

plug-in peripherals for big mini-computer performance



Whichever little computer you own, whether a PDP-8/E, NOVA, or other, our line printers and magnetic tape transports will plug directly into your equipment to provide big performance at little cost. Specifically designed for your mini-computer, they offer easy operating features, compact size, low maintenance.

Take our line printer... only slightly larger than a typewriter, its print quality is equal to or better than that of \$30,000 machines with the sixth copy almost as clear and crisp as the first.* It has a swinging yoke for easy front loading of paper and ribbon replacement, plus a simply-changed font belt, so that a clerk can operate it like a veteran with minimum instruction.

Our magnetic tape transports come in a wide range of speeds and tape densities. Tape threading is eliminated by a unique leader clamp system and reel loading is a one-hand operation because of our snap-on/snap-off hub release.* The self-contained formatter saves both cost and space. Incorporating the latest in technology and packaging, the transports are highly reliable and easy to maintain.

And if ever required, Digitronics' nationwide experienced field service organization is available for on-call service. Digitronics Corporation, Southboro, Massachusetts 01772—617/481-2500.



*See these features demonstrated at Computerworld's Computer Caravan: Boston—Feb. 22, 23, 24 / New York—Feb. 29, Mar. 1, 2 / Washington, D.C.—Mar. 7, 8, 9 / Atlanta—Mar. 14, 15, 16 / Dallas—Mar. 21, 22, 23 / Los Angeles—April 4, 5, 6 / San Francisco—April 10, 11, 12 / Chicago—April 18, 19, 20 / Detroit—April 25, 26, 27

Meet the mind expander. Monolithic Main Memory from **ITEL**.

Now there's an easy, economical way to expand IBM System/360 or 370 memory: add on Monolithic Main Memory from ITEL. (The Monolithic Main Memory is manufactured to ITEL specifications by Advanced Memory Systems of Sunnyvale, California.)

This monolithic memory lets you upgrade core at a lower price than core. It's far more reliable than core. And you can maximize capacity. For example, you can expand the 360/30 to 128K, the 360/40 to 512K, the 360/50 to 1024K and the 360/65 to

2048K. For the 370, we match IBM byte for byte, and offer substantial savings in cost and space.

The secret of ITEL's superiority over IBM core is found in its basic monolithic memory module. This semiconductor chip contains 1024 bits of storage. These memory elements are fabricated in batches of thousands, which cuts costs dramatically. And most wired interconnections are eliminated, so there are far fewer potential sources of failure.

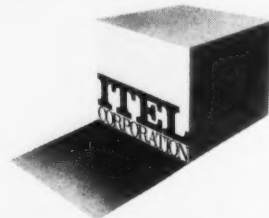
But even monolithic memory elements can sometimes fail. That's why ITEL has ECC: Error Checking and Correction. Should a memory

element fail, ECC corrects the error instantly. There is no effect on computer operations or processing. The operator is notified by an error light and maintenance can be performed without interrupting the memory's operation.

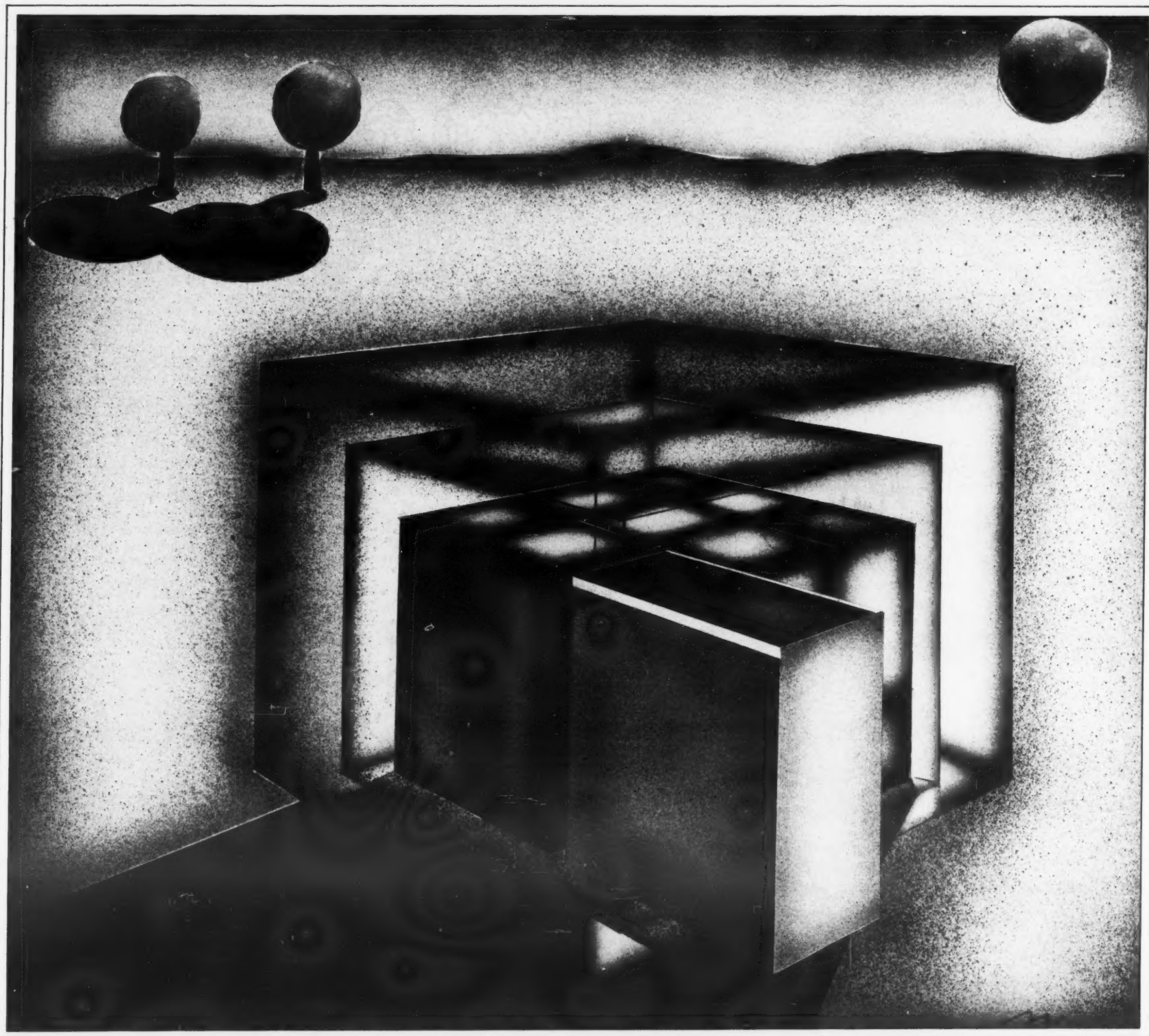
The Monolithic Main Memory from ITEL means savings in cost. Savings in speed. Savings in maintenance. And, in some cases, savings in floor space. It's completely compatible with IBM System/360 and 370. Handles all memory size changes. And it can be leased as

well as purchased, so you can meet your immediate memory needs now without a large outright purchase.

ITEL is out to improve the system. With technical advancements. Complete corporate sales support. National field service. Around-the-clock maintenance. And with the people and financing policies that can create a customized solution to your particular problems. So meet all the ITEL mind expanders at your nearest ITEL office.



ITEL Corporation, DPG, One Embarcadero Center
San Francisco, California 94111, Phone: (415) 989-4220



Varian: On the move.

We're out to demonstrate why we're the company to beat in minicomputer systems. In our Caravan showing, you can get your hands on the fastest, most powerful minicomputer system in the world, on-line to a super-fast printer/plotter. And there's a versatile, user-oriented data acquisition and control system too!

620/f with VORTEX: A Major Breakthrough in Minis. This is the minicomputer system which beats the far more expensive systems like IBM 1800, CDC 1700 and XDS Sigma 3 at their own game. We'll demonstrate FORTRAN IV compilations in background and let you look into your own future with our Operation Aquarius in foreground.

STATOS 21: Prints your personal horoscope. Free. We've tied our STATOS 21 printer/plotter on-line to the 620/f with VORTEX to let you write in your name, address and birthdate. You'll get your personalized horoscope complete with plot of your

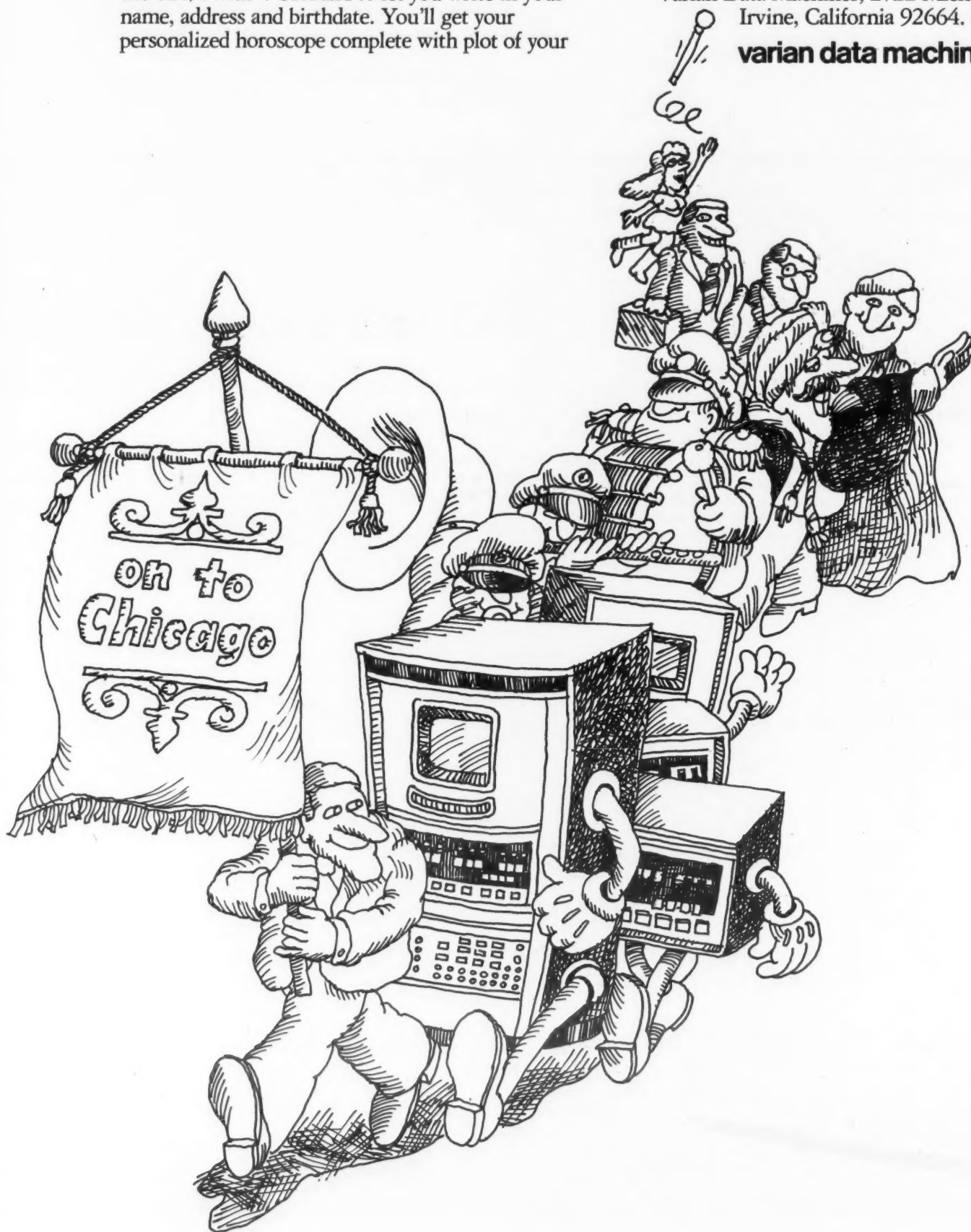
birth sign printed at the rate of 5000 lines or 60 pages of graphics per minute. Or both. Versatile. Fast. Incredible.

ADAPTS: Plug-in computer experience. A packaged solution for your problem, ADAPTS will control experiments, handle files, and process data. Programmed conversationally, it makes even inexperienced computer personnel look like computer professionals in no time. Loads of hook-ups: easy to change. You are the key in this demonstration. With Extended BASIC, it's simple.

We've got an exciting show, a clear demonstration of system capability in the minicomputer marketplace. And why we can say, with confidence, we're on the move.

Varian Data Machines, 2722 Michelson Drive,
Irvine, California 92664. (714) 833-2400.

varian data machines 



Bits & Pieces

National, Local Cards Used With Credit System Option

HUDSON, Mass. — An option recently added to its CS-1500 free-standing credit authorization and information system by Datatrol, Inc. allows the use of national credit cards as well as private cards.

The ability to verify and authorize national cards was achieved by modifying the software, building additional features into terminal controllers and implementing extra push-buttons on the point-of-sale terminal, the company explained.

Datatrol is at Kane Industrial Drive, 01749.

Data General Cuts Service Cost

SOUTHBORO, Mass. — Price reductions averaging 20% in field service maintenance contract rates, reduced prices for warranty extension contracts and the elimination of fixed-price installation charges have been announced by Data General Corp. for all Nova minicomputers.

Credit System Uses Telephones

SAN DIEGO — A credit authorization system which uses Touch-Tone telephones as input terminals to provide digital inquiry to a computer, voice answer-back and automatic referral to a credit authorizer has been developed by Wavetek Data Communications.

The Wavetek system features low installation costs, direct computer connection, high speed and continuous updating and revision. The system is plug-compatible with IBM 360 and other EDP systems.

System purchase prices start at \$50,000. Monthly cost on a lease/purchase plan starts at \$1,550. Delivery is 90 days from P.O. Box 651, 92112.

Error-Free Tape Uses New Oxide

BEDFORD, Mass. — A magnetic tape designed for error-free operation at 1,600 bit/in. (3,200 flux change/in.), "2000 A.D." from the Computer Products Division of BASF Systems, Inc., is coated with a small-particle oxide that is said to permit the tape to lie flatter, thus resulting in better capstan control and head contact.

The tape is priced at \$16/2,400-ft reel with quantity discounts available. Delivery is immediate from Crosby Drive, 01730.

'As Good as IBM'

Independent Tape Drives Please Users

By Frank Piasta
Of the CW Staff

The average user of independent tape drives feels his units are performing at least as well as the IBM drives they replace, according to a *Computerworld* survey.

The relatively few negative comments were made by users who admitted they would still consider independents for their next drives.

A Chicago user reported problems still exist in interfacing with the IBM customer engineers. "You've got to keep beating them (IBM) on the head to get good service. If a problem turns out to be in the other equipment," he said, "IBM

will bill me in addition to my regular prime shift maintenance charge, even though it occurred during prime time. I'm fighting that pretty strongly," he added.

The major area of complaint against the independents is maintenance, according to the survey, although no pattern according to manufacturer is evident.

Independent Tape Survey

A user in Manhattan claimed to have better service with independents than IBM, while another customer of the same manufacturer, in Chicago, thought his installation was being used as a "training school."

Even the users who complain about the service and the independent equipment admit the savings in monthly rentals more than compensate for the problem areas. Several larger installations said a spare drive was supplied by the manufacturer in case of equipment malfunction.

One user said he could not recommend his independent drives for an installation heavily dependent on tapes. The drives, however, were adequate for the needs of a site that was primarily disk-oriented, he stated.

Cost was the primary consideration when independent drives were selected,

but the majority of users surveyed said the performance was also a factor in returning to the same vendor for their next drives.

Most users surveyed experienced several service problems upon installation. This was accompanied in some cases by operator training problems. Some independents, for example, position their supply and take-up reels opposite to that found on IBM drives, requiring some adaptation. Other users reported "teething problems" with automatic threading devices, but said these were soon eliminated.

In some companies there is a conflict between the financial and operational factions. One executive, responsible for switching his installation to independent peripherals to reduce costs, said "operating people tend to blow up any kind of problem. They'd just as soon have IBM." He attributed this preference to slightly better IBM field maintenance. The name itself was also seen as part of the problem. "Anyone who makes an 'IBM' decision is supersafe," he commented.

The most vocal proponents of independent peripherals, the survey showed, were the Potter and Telex users, followed by Ampex tape drive users. Some indicated they had based their choices on the availability of other peripherals, such as disk memories and printers, from the same manufacturer to minimize service problems.

Unit Hooks MC/ST To Teletypewriters

ARCADIA, Calif. — A converter from Western Telematics, Inc. provides an interface between an IBM Mag Card Selectric Typewriter (MC/ST) and computer terminals or intra-company message systems.

The MCS-3 develops 128 Ascii characters from the keyboard, prints 88 characters and responds to standard X-On, X-Off functions for interactive processor use.

No Interference

The interface is connected without interfering with the machine's normal functions, including its storage and editing capabilities, the company said. Output is standard serial EIA RS232 to 103-type modems or acoustic couplers.

Switch-selectable speeds of 10 and 15 char./sec permit operation with Teletype Models 33, 35 and 37 ASR and KSR, and Ascii-compatible computers. On-line interactive control with the MC/ST's magnetic store, printer and keyboard are provided. An additional fast-scan mode of 30 char./sec from the 5,000-character mag card permits quick-look editing from a CRT, line printer or transmission to an external tape or processor, the company said.

Applications include time-sharing processors with Ascii terminals, communications and order systems where the editing capabilities of the MC/ST can be applied. A combination of a CRT and MCS-3 provide versatile editing and teleprocessing terminal capabilities, the company said.

The MCS-3 is available on a purchase-only basis for \$3,500, including a three-year warranty. Delivery is eight weeks from 5507 Peck Road, 91006.

Varian Calls Minis Better Value

IRVINE, Calif. — The 100 Series of Varian Data Machines' 620/f and 620/L minicomputers offers better price/performance ratios than earlier models.

The 620/f-100, Varian said, has all the performance characteristics of the 620/f at lower cost. The 620/f-100 costs \$27,200, compared to \$33,000 for a 32K word 620/f.

Also included at no extra cost in the 620/f-100 are several features that were extra-cost options — memory protection, extended arithmetic unit, real-time clock and power failure/restart.

The 620/L-100 offers higher internal speeds than its predecessor. Cycle time has been improved from 1.8 μ sec to 950 nsec. Included as standard in the 620/L-100 are hardware multiply/divide, real-time clock, power/failure restart and eight levels of priority interrupts, optionally expandable to 64 levels.

Prices for the 620/L-100 range from \$6,400 for a 4K word memory configuration to \$22,750 for a 32K machine.

Varian says both new models are com-

pletely compatible with other 620 models both on a hardware and software basis. Delivery is immediate from 2722 Michelson Drive, 92664.

Braille Punching Terminal Aids Blind Programmers

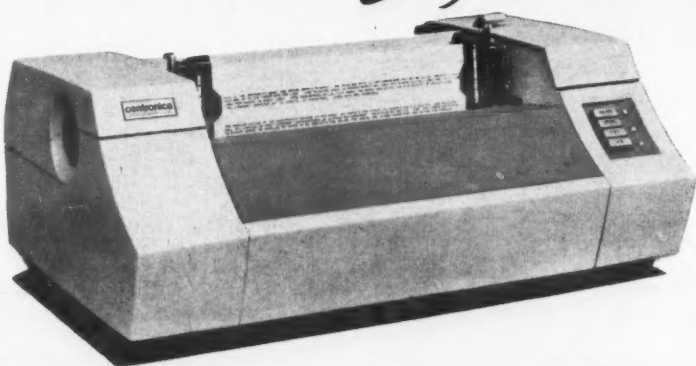
ROCHESTER, N.Y. — A portable terminal that punches Braille in parallel with a TTY or EIA-interfaced teleprinter lets blind programmers check the accuracy of typing and read error messages from the computer.

The BD-3 Braille Control Electronics and Embossing Device is produced by the Association for the Blind of Rochester and Monroe County, Inc.

According to S.E. Skinner, association computer department manager, the device enables the individual to operate, program and machine-debug programs completely independently, even though totally blind.

Mounted in a briefcase, the BD-3 costs \$1,850 and is available on 45-day delivery from 439 Monroe Ave., 14607.

More than **1,500** new reasons



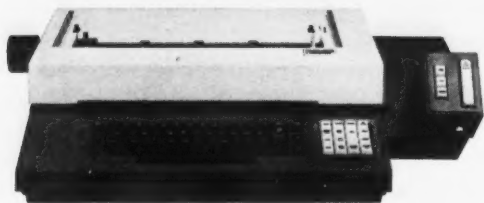
why you should write now to get more information.

*Centronics began delivery of the Model 101 printer last March. To date, we have delivered more than 1,500 units.

Write the Marketing Department

CENTRONICS

Centronics Data Computer Corp.
One Wall St.
Hudson, N.H. 03051
603-883-0111



This is the new Novar 5-60 ASCII terminal that features a standard Selectric correspondence keyboard and type sphere, built-in 350 character buffer, built-in tape recorder, and a built-in modem. Transmission rates up to 2400 baud!

Novar Corporation • 2370 Charleston Road
Mountain View, Calif. 94040 • (415) 966-2272
Offices in Principal Cities

GTE INFORMATION SYSTEMS
INCORPORATED

With Add-On

370/155 Memory Cost Cut by 25%

SUDBURY, Mass. — Users of IBM 370s have still another independent add-on to consider with the introduction of a solid-state memory by Memory Technology, Inc.

The first plug-compatible product from the company, the MTI-755, is designed for the 370/155, replacing the IBM 3630 memory unit used with the 155 and 165, at a 25% lower price.

Claimed by the company as the first in a series of memory products for the 370 line, the MTI-755 is restricted to a maximum system capacity of 2M bytes, the maximum offered by IBM.

The MTI-755 attaches to the storage adapter without CPU modifications.

The company chose MOS tech-

nology for its memories, according to a spokesman, because it offers the user lower cost and higher reliability than bipolar devices. Power consumption is only one-tenth that required by core and from one-tenth to one-twentieth that needed by bipolar units.

The MTI-755 is priced at

\$99,000/256K increment, a savings of 25% compared to the \$132,000 price of the 3630. Leases will be available but no prices have been set as yet. Third-party maintenance will cost \$290/mo. First deliveries are scheduled for the second quarter of 1972 from 83 Boston Post Road, 01776.

Diva Off-Line Printing Station Uses IBM Disk Packs as Input

REDBANK, N.J. — Diva Associates has combined its minicomputer-to-disk interface with a line printer to produce an off-line print station that can use disk packs produced on IBM systems as a source of input.

The print station can use 1316, 2315, 2316 or 5440 disk packs generated on System 3, System 7, the 1130 or 360.

The Model 50 print station, intended for a 360 installation, includes a minicomputer, line printer and either a 2311 or 2314 compatible disk drive as well as necessary software. The model 53 includes most of the same equipment, but either a 5444 or 2310 disk drive is substituted.

A printer capable of operating at 600 line/min is included. The minicomputer has 8K of core memory and can be programmed to perform as a stand-alone system.

Operation of the print station is described as extremely simple:

the print station disk drive reads data from the pack and provides printouts off-line. The capability to write data on the pack using IBM-compatible techniques is an option.

The Diva system is especially beneficial to the completely disk-oriented system user who would have to install a tape drive to utilize most available off-line printing systems, according to the company.

The Model 50 costs \$59,750 or \$1,285/mo on a 66-month lease. The Model 53 costs \$49,750 and can be leased at \$1,070/mo.

Diva Associates is at 58 Maple Ave., 07701.

Cassette Deck Added To Delta Data CRTs

CORNWELLS HEIGHTS, Pa. — Delta Data Systems Corp. has made available the TC-2 digital cassette tape recorder to be used with its Telterm CRT terminals and Multiterm terminal controllers.

The deck is available in single and dual-deck versions and features a search option. Data can be recorded in fixed block lengths of 256, 512, 1K, 2K and 3K characters.

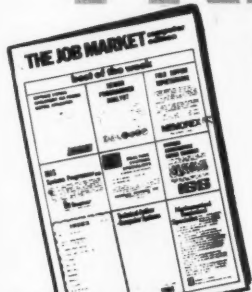
Prices begin at \$1,950. Delivery is 45 days from Woodhaven Industrial Park, 19090.

Graphic Plotter Bows

PALO ALTO, Calif. — An inexpensive graphic plotter with writing speeds compatible with minicomputer speeds is available from Hewlett-Packard. The HP Model 7210A Graphic Plotter processes coordinate pairs up to 20/sec, and draws symbols at speeds to 5/sec. Virtually silent even at these speeds, the Model 7210A plots faster than many higher-cost incremental plotters, HP said. The 11 in. by 17 in. graphic plotter costs \$3,400 for minicomputer users. Delivery is 45 days.

FREE

Thousands of computer job opportunities...



THE JOB MARKET

Send away for a
free issue NOW.

An amazing new publication that offers the most comprehensive collection of computer job openings available anywhere. And it's YOURS... ABSOLUTELY FREE!

If you thought we were in a tight job market, you'll think again when you see page after page of computer job openings that you never knew existed. Everything from programming, hardware development, field support and sales, to top level technical and administrative management positions.

And where are these thousands of opportunities? All over the world: United States, Canada, Europe, Australia, London, Paris, Vancouver, Miami, Denver, San Jose, Boston... just to name a few. Many of these employment opportunities are clipped from the Financial and Classified Ad Sections of more than 200 leading newspapers in the United States and from around the world... Others come from companies who advertise ONLY in THE JOB MARKET.

CRUCIAL INFORMATION

If you're building a career in computers, THE JOB MARKET is the one tool you won't want to be without. Its comprehensive coverage of computer job openings from around the world supplies the vital information YOU need to make important career decisions. A half hour a week with this remarkable publication, and you'll know what's happening throughout the computer industry, both at home and abroad. NOW, with the help of THE JOB MARKET you can take a look at other opportunities, and compare YOUR job with positions, salaries, companies, benefits, and locations from around the world. AT LAST!... You can finally afford to be selective about the future you want for yourself. And with THE JOB MARKET at your side, you can do it all in the privacy of your own home.

Find out if your talents and skills are really in demand. Keep abreast of personnel trends throughout the industry, and protect your future in computers from the threat of obsolescence.

If your skills are NOT in demand, THE JOB MARKET will show you how to adjust to the industry's needs, and how to fit more effectively into tomorrow's job market. If your skills ARE in demand, you'll find in THE JOB MARKET, a world of computer opportunities that you never knew existed...

hundreds of better jobs, with better salaries, in better locations. And they're all yours to discover THIS WEEK... and every week, in THE JOB MARKET.

END FRUSTRATION

Don't miss out on a great future and a great career, when just pennies a day can bring you all the information you need to build the future YOU want. Take it from the computer pros: "there's no sense waiting (and often just plain hoping) for promotions, when hundreds, literally thousands, of better computer opportunities already exist." Aggressive computer professionals are getting ahead every day, because they're making the right moves at the right time. And NOW, with THE JOB MARKET working for you, it's a cinch to do the same... no magic... no miracles... just a little bit of research, and a pinch of common sense. Now YOU can beat the frustrating computer promotion game, and get the future YOU want, without risking your present job in the process. And you can do it NOW, with THE JOB MARKET.

Don't let your future just happen. Find out where you stand in today's job market... and where you COULD stand in tomorrow's. Let THE JOB MARKET show you all the choices you really have... choices in salary, geography, company, position, benefits... and more!

Can you really afford not to take a look? One sample issue FREE and no obligation.

Your job is your life, and a better job means better living for you and your family. The future is NOW, so don't put your future off another day! IT COSTS YOU NOTHING to examine a FREE issue of this exciting new publication.

Don't delay! Fill out the NO-RISK coupon, mail it TODAY, and we'll rush you a FREE sample issue of THE JOB MARKET/Computer Edition.

"Don't miss this opportunity to assure yourself and your family the security of knowing where you stand in today's rapidly changing job market."

JOB MARKET Publications Inc.
Wilford Bldg./33rd & Arch Sts.
Dept. 3215/Phila., Pa. 19104

MAIL THIS
COUPON NOW

Gentlemen:

Send me a complimentary issue of THE JOB MARKET/Computer Edition. If your publication is as valuable as you say it is, I will subscribe for the additional period indicated, and pay upon receipt of your bill. On the other hand, if I am not totally delighted, I will return your invoice marked "cancel" within five days, and owe nothing.

- ☐ 4-week First Class Mail subscription \$12.60 (\$3.15/week)
- ☐ 13 weeks for the price of 8½ weeks \$27.30 (\$2.25/week)
- ☐ 26 weeks for the price of 11½ weeks \$36.40 (\$1.40/week)
- ☐ 52 weeks for the price of 17½ weeks \$54.60 (\$1.05/week)
- ☐ Send Airmail (20¢/week additional)

My Name _____

Home Address _____

City _____

State _____

Zip _____

Telephone Number _____

I PREFER TO PAY NOW, and

☐ Enclose a check/money order for the amount shown above
☐ Charge it to my ☐ American Express ☐ BankAmericard

Card No. _____

Signature _____

THANK YOU for paying in advance and saving us the usual billing and red tape expenses. Besides your first free copy, we'll add an EXTRA FREE ISSUE to your 4-week subscription; 2 extra free issues to your 13-week subscription; 3 extra free issues to your 26-week subscription and 4 extra free issues to your 52-week subscription. Full money-back guarantee, naturally.

P.S. In addition to the above, I further understand that I may cancel my subscription any time after receiving my second issue and receive an immediate full and unquestioned short-rate refund on the balance of my subscription.

JOB MARKET Publications, Inc.

Dept. 3215/Wilford Bldg./33rd & Arch Sts./Phila., Pa. 19104

360-370 DOS/OS NUMERIC TO CHARACTER DATE CONVERSION

CHARDATE — our \$10 module to convert numeric dates to character — either formatted, 'THURSDAY, SEPTEMBER 23, 1971' or unformatted 'THUR THURSDAY SEP SEPTEMBER' Easily used by programs in ALC, COBOL, PL/1, etc. send check or purchase order for only \$10 to receive ALC source and write up.

Contact H. Dick Breidenbach
Computer Services Corporation
23225 Northwestern
Southfield, Michigan 48075
(313) 444-5030

'Largest Meeting'

NCR Users Set to Convene April 17

DAYTON, Ohio — Over 400 NCR users are planning to gather here April 17-19 in what may be the largest NCR users' meeting yet, according to the firm. Discussion topics include hardware, software and applications-oriented techniques.

Conversion problems to the century computer, small-scale

data processing centers and designing site security are some of the sessions of general interest. The session on small centers, led by Fred R. Hodgins of Charles Taylor & Associates, will examine characteristics and financial setup of a center, equipment and programming techniques.

"People security," fire protection systems and alarm systems are all part of site security, which will be covered by representatives from Pinkerton, Inc. and an NCR fire marshal.

Robert Morgan of ESB, Inc. will lead the session on conver-

ACM Head Lists Proposed Goals, Cites Need for Formal Statement

NEW YORK — "It is simply beyond my comprehension," said ACM President Walter Carlson, "that an organization of ACM's size and age should try to muddle along with no formal statement of its goals."

In explaining a change in game plans, Carlson indicated in the *Communications of the ACM* that members had been informed in November the ACM Council "would be taking some form of action on a set of goals distilled from efforts of three panels." But this is not to be, he added.

"As one step in the search for a consensus," Carlson has bared his files on the proposed ACM goals, which were developed from the panels and an informal ballot by 14 council members. Carlson's two-year term as president expires May 31. "I contend that an ACM member deserves more for his dues than a random walk through an unprogrammed forest of programs, projects and activities."

Proposed Goals

In order of priority, the proposed goals include:

- "Maintain and extend ACM's accomplishments in publishing the world's most authoritative materials on computer science."
- "Establish ACM as the leading technical society serving the business DP community."
- "Raise the skill levels and the performance of computer professionals."
- "Establish and maintain up to date recommendations for all general curricula on computer science... and guidelines for accreditation."

- "Create member services to attract and hold professionals in DP-related fields as ACM members."

- "Establish authoritative definitions and quantification of basic principles... used in data processing and computer design."

- Establish and maintain one unified structure for the technical societies...

Second Rank

Proposed goals placed in the second rank of importance include:

- Strengthen role of local ACM chapters.
- Publish and disseminate information regarding personnel and employee matters.
- "Increase emphasis on personal responsibility for performance through promulgation of profession-wide guidelines."
- "Find a better way for a profession-wide attack on common problems facing the industry," such as standards, productivity, performance measurement.
- "Take formal stands in major public policy areas" where computer technology can aid in solutions.

Research Gets \$1,000 Award

TAMPA, Fla. — The Fifth Annual Simulation Symposium has awarded \$1,000 for research using simulation to Joe K. Clema, University Computer Center, Colorado State University. Julian Reitman and Jerry Katzke of the Norden Division of United Aircraft Corp. received \$500 best paper award for their work entitled "Approaching a Universal GPSS."

Societies/
User Groups

sion problems.

Software sessions will examine Neat/3, Basic, Cobol, Score, Fortran, the 315 Neatflow program, Release 8, the B-2, B-3 and B-4 Operating Systems.

Scientific subroutines (what is available and applications), the use of a load instruction in a program subroutine, linear programming and general file conversion utility are among the sessions on programming techniques. System development and programming time, led by Paul Waller of Citrus Central, will review estimations of programming time for a given system.

Preregistration charge for the conference is \$50. Registration on arrival costs \$60. More information is available from Customer Relations, EDP Products, NCR, 45409.

THE
SPOOLER
FROM BOOTHE

PERFORMANCE PERFORMANCE PERFORMANCE

The Boothe SPOOLER — Designed, developed and marketed by Boothe Computer Corporation. The SPOOLER software product provides between 20% and 40% additional throughput for IBM 360-DOS users. The successful 4K SPOOLER system has been enhanced and is now available in a 6K version. The enhanced SPOOLER software package consistently out performs other spooling systems. The Boothe SPOOLER can be rented for \$200 per month or purchased for \$4000.

Write or call Boothe today in order to arrange a 15 day trial without obligation. Boothe has offices in Los Angeles, San Francisco, Sacramento, Chicago, Dallas, New York, Toronto and Washington, D.C.



Contact: Larry A. Lynch
Vice President
BOOTHE MANAGEMENT SYSTEMS
15432 Ventura Boulevard
Sherman Oaks, California 91403
Telephone: 213/986-1062

UPGRADE
YOUR PDP-11 WITH
STANDARD
MEMORIES'
NEW ecom® F-11
ADD-ON MEMORY SYSTEM!FIELD-EXPANDABLE!... Just add-on PLUG-COMPATIBLE
ecom® F-11 CORE MEMORY... in 4K or 8K INCREMENTS!

STANDARD MEMORIES, INC., long a leader in the design and production of reliable Core Memories, has expanded the capability of the field-proven ecom® SERIES F, 750 nanosecond cycle time system to include a plug-compatible extension Magnetic Core Memory system to upgrade Digital Equipment Corporation's PDP-11 Family of Mini Computers.

OUTSTANDING FEATURES:

- Fully compatible, all programs and diagnostic routines for PDP-11 processor.
- Two basic self-powered mechanical configurations offered:
 - 5 1/4" panel height enclosure, capacities from 8K to 32K in 4K or 8K increments.
 - 12 1/4" panel height enclosure, capacities from 16K to 128K in 4K or 8K increments.
- All systems are field-expandable by simple addition of Standard ecom® F digital stacks in 4K or 8K increments.
- Upgrades PDP-11 to 800 nanosecond memory cycle time with data access time of 350 nanoseconds.

OPTIONS:

- Parity
- Interleaving
- Rack or Table Top Cabinet

Call or Write for Demonstration and Prices:

STANDARD MEMORIES, INC.

National Sales Office:
Suite 307/2801 East Oakland Park Blvd.
Fort Lauderdale, Florida 33306
(305) 566-7611

• Western Region:
15130 Ventura Boulevard
Sherman Oaks, California 91403
(213) 788-3010

• Eastern Region:
569 River Road
Fairhaven, New Jersey 07701
(201) 842-3160

• Midwestern Region:
7132 North Harlem
Chicago, Illinois 60631
(312) 792-3242

• European Affiliate:
APPLIED MAGNETICS, Belgium
Industriezone Raadsheerstraat
2300-Turnout, Belgium
014/45911 (phone)

STANDARD MEMORIES
INCORPORATED
A Subsidiary of Applied Magnetics Corporation

FOR SALE OR LEASE
ALL 360 SYSTEMS &
I/O EQUIPMENT
AT SAVINGS OF
50%-70%

Save at least 20% on
medium term System / 370
Operating Lease

We wish to purchase
360 equipment available
for immediate or future delivery.

Please contact: Bernard Gest

COMPUTER MARKETING INC.

7704 Seminole Ave. / Melrose Park, Pa. 19126

(215) 635-6112

Free Computer Marketing Bulletin

Computer Users' Forum & Exposition

The National
Computer Conference
That's Coming To You

The Need

The computer age is moving into a new stage. Until now, computer makers have dominated the scene, introducing one breakthrough after another in the state of the art. The time has come to pause and consider the computer user. You need more opportunity to improve on the systems you now have.

The Solution

A Computer Users' Forum, run by professionals and designed to bring regional users together in manageable groups to discuss mutual EDP problems with other users, and with regional and national experts . . . and a chance to study and evaluate new equipment and services that will be shown in the presentations of leading EDP suppliers comprising the Exposition.

The Format

Each Day 9:00-9:40 Keynote address by a nationally known expert — an independent, not a vendor — on the day's main subject. Sets the stage for discussions.

9:40-10:30 Panel discussion led by regional experts chosen for their progressive management principles. Questions encouraged.

10:40-11:45 Workshops — panel members conduct separate workshops. Your specific questions fielded, worked out.

12:15-1:30 Conference luncheon — keynote speaker summarizes chief points covered during panels and workshops.

1:00-7:30 Exhibits open, stay open 'til 7:30. Exhibitors will show the latest in hardware, software, services.

The Subjects

First Day: Data Entry

Keynote speaker; Lawrence Feidelman, President, Management Information Corp., Cherry Hill, N.J.; Editor, *Data Entry Today*.

Panels and workshops will be grouped by these four subjects:

- Keypunch replacement; key to tape, disc and cassette devices.
- OCR.
- Intelligent terminals — distributed processing.
- Direct data entry/source data automation.

Second Day: Data Communications: The Choices

Keynote speaker; Dr. Dixon Doll, Data Communications Consultant, faculty member, Graduate School of Business, Eastern Michigan University.

Panels and workshops will be grouped by these four subjects:

- Communications equipment from main-frame makers and common carriers.
- Communications equipment from independent suppliers.
- Data transmission via private (lines, microwave) networks.
- Data transmission via carriers (lines, microwave).

Third Day: Operational Efficiency

Keynote speaker; Charles Lecht, President, Advanced Computer Techniques, N.Y., N.Y., author of *The Management of Computer Programming Projects*.

Panels and workshops will be grouped by these four subjects:

- Core extensions.
- System/utility software modifications.
- Independent peripheral usage.
- Dedicated systems vs. general purpose computers.

Panel Members & Workshop Leaders

The regional experts who will run the panels and workshops have been chosen from a wide range of firms and institutions. Some will participate in more than one session, depending on their experience and expertise.

PLAN NOW TO ATTEND

THE COMPUTER CARAVAN

Computer Caravan is a division of Computerworld, the Newsweekly of the Computer Community.

797 Washington Street, Newton, Massachusetts 02160, Telephone (617) 332-5606

This information is necessary
to provide a better Forum for you.

PLEASE CIRCLE ONE NUMBER
IN EACH CATEGORY

YOUR INDUSTRY

- 01 Mining/Construction/Oil & Refin.
- 02 Manufacturing — Computer or data system hardware, peripherals/other associated mechanical devices
- 03 Manufacturing (other)
- 04 Utilities/Comm. Sys./Transport.
- 05 Wholesale/Retail
- 06 Finance/Insurance/Real Estate
- 07 DP Serv. Bureaus/Software/Plann.
- 08 Business Services (except DP)
- 09 Education/Medical/Legal
- 10 Federal, State and Local Govt.
- 11 Communications/Printing/Publ.
- 12 Other: _____

YOUR FUNCTION

- 01 Corporate Officer
- 02 Data Processing & Other Operational Management
- 03 Data Processing Professional Staff
- 04 Consultant
- 05 Lawyer/Accountant
- 06 Engineering — Mgmt./Scientific/R&D
- 07 Sales/Marketing
- 08 Librarian/Educator
- 09 Other: _____

Mail this registration form to:

Charlie Asmus
Computer Users' Forum & Exposition
797 Washington Street
Newton, Mass. 02160

Name: _____

Title: _____

Company Name: _____

Address: _____

City: _____ State: _____ Zip: _____

Exposition Sites & Forum Schedule Please Check City Where You Will Attend

City	Location	Dates
<input type="checkbox"/> Chicago	Palmer House	Apr. 18-20
<input type="checkbox"/> Detroit	Cobo Hall	Apr. 25-27

Please register me for:

- ☐ DATA ENTRY — Day One; ☐ DATA COMMUNICATIONS: The Choices — Day Two;
☐ OPERATIONAL EFFICIENCY — Day Three; ☐ EXPOSITION ONLY

I enclose my check for:

☐ \$25.00 for one day ☐ \$45.00 for two days ☐ \$60.00 for three days

(Make checks payable to "Computer Caravan")

The above prices include all workshop materials, luncheon, and admission to the Exposition Hall.

☐ \$5.00 for Exhibits only.

TICKETS WILL BE HELD IN YOUR NAME AT THE DOOR. FOR MULTIPLE REGISTRATIONS PLEASE COPY THIS FORM AND USE A SEPARATE SHEET FOR EACH REGISTRATION.

4 DP Courses Suggested for Small Schools

By Don Leavitt
Of the CW Staff

ST. LOUIS — The Subcommittee on Small College Programs has recommended to the ACM Committee on Curriculum a series of four courses that would be appropriate for those schools with limited resources, but "with an interest, enthusiasm, and desire" for some computer science offerings. The suggestions are contained in a report made possible in part by funds from the National Science Foundation.

A working paper outlining the courses was presented recently

More DP Urged For Industry

ST. LOUIS — There is a real place for computer science education in industry, to complement computer science education in the universities. Beyond that, there has to be much greater cooperation between industry and educators, according to Dr. Edward S. Kopley, director of IBM's Systems Research Institute (SRI).

Industry needs more than conventional DP training classes to take full advantage of constantly changing technology, Kopley told the ACM technical symposium. Universities have to learn to cooperate with one another, as well as with industry, he added.

Over 750 Programs Offer College Degree

ST. LOUIS — With more than 750 degree programs in computer science being offered by U.S. colleges and universities, any question of the validity of the discipline as a course of study would seem "academic," Dr. William Atchison of the University of Maryland said in his keynote address at the ACM technical symposium.

The precise number of programs, which range from the associate level to the PhD, and the number of students involved, are not easily determined, he said, because computer science is sometimes still considered a subdivision of another discipline. Faculty teaching DP subjects may be counted under mathematics, engineering or physics departments, he added.

to the Second Technical Symposium of ACM's Special Interest Group on Computer Science Education. The authors, Richard Austing of the University of Maryland and Gerald Engel of

Education

Hampden-Sydney College, invited comments before they finalized their proposal.

Three of the proposed courses are based on parts of ACM's "Curriculum '68," intended for

schools that can mount a major program in computer science. The proposed courses represent a coherent program, but are so structured as to allow a student to pick and choose those relevant to his needs, Engel noted.

Course 1 is introductory and includes student work in a high-level programming language. Actual programming thus precedes course 2, which considers social implications and applications.

Problems in the second course will be far more meaningful if the students have an apprecia-

tion of the effort involved in programming, Austing explained. He noted that course 2 has no equivalent in "Curriculum '68."

In course 3, the student gains familiarity with various aspects of computer systems and how they interact. Finally, in course 4, the concepts and use of data representation and organization are considered.

The courses are designed for schools in which no more than one full-time equivalent faculty member is available to teach computer science, Engel said.

360/370 LEASING

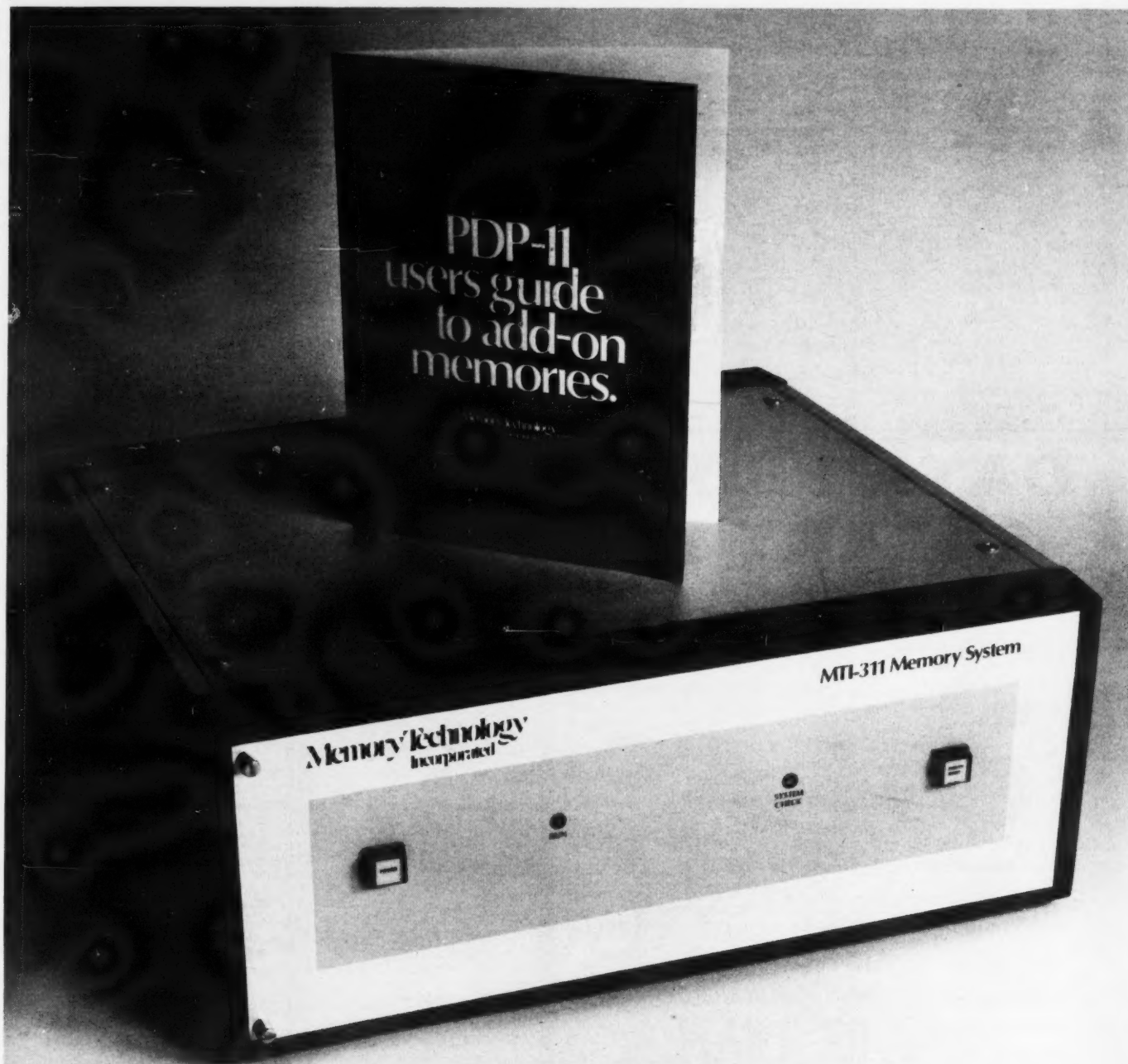
Contact:

Comdisco, Inc.

John F. Kofler

(312) 297-3640

2200 East Devon Avenue
Des Plaines, Illinois 60018



Get help...free.

Is your PDP-11 running short of memory? Get help. Look into our new fully compatible semiconductor Add-On Memory.

Let us show you how to expand working storage. Easily. Efficiently. With our MTI-311 Add-On Memory. High performance characteristics include 600 nanoseconds Read cycle; 800 nanoseconds Write cycle. Reliability? Monolithic semiconductor technology cuts component and inter-connection count for a fivefold improvement in reliability over core memory. And, costs are lower. Capacities up to 28K words in a single module. Field expandable with 4K-word plug-in cards.

Get help... free. We'll share full details. Including easy interface of the MTI-311 with your PDP-11. Write Memory Technology, Inc., 83 Boston Post Road, Sudbury, Massachusetts 01776. Or call Roger Marino. (617) 443-9911.

Memory Technology
Incorporated

CANADIAN EDP MARKET INFORMATION

- Market Surveys
- Competition Analysis
- Government Attitude
- Import Regulations
- Representation

Write in confidence indicating nature of interest to:

**FEDERAL SYSTEMS
OF CANADA**

P.O. Box 5261 Station F
Ottawa, Canada

Project Studies Terminals for Doctors

CAMBRIDGE, Mass. — Computer aids similar to those developed for hospital applications are now used in 11 medical practices as part of a major project sponsored by the U.S. Public Health Service and conducted by Bolt Beranek and Newman Inc. (BBN). This project is a first step toward putting the computer where an estimated 80% of health care is delivered — in the practitioner's office.

The project is addressing some important questions that should be answered if computer terminals are to become standard office equipment. Can computer usage save time for the physician by taking over lower-order tasks and enabling him to see more patients? Can it gain acceptance from physicians, nurses and patients? Can it improve the quality of health care delivery? Will its benefits justify its cost?

BBN has placed the terminals in physicians' offices, free of charge, is supplying individualized orientation, and is coordinating a total of 70 engineers, physicians and paramedical personnel involved in the project.

Participants include six physicians' offices in the Boston metropolitan area, one in Maine, one in Maryland and three in Washington, D.C. The computer terminal in each of these offices is connected by phone lines to a single computer operated by Meditech, Inc. here. In choosing participants for the study, BBN selected practices representative of rural, suburban and inner-city offices. Sizes of practices also vary, ranging from individual family practitioners to large health maintenance organizations.

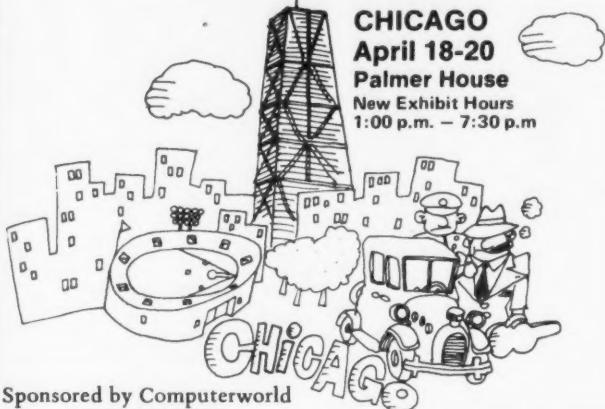
In the first phase of the project, doctors are using a program that automates the taking of a patient's medical history. A CRT displays multiple-choice questions that are answered by a patient at the terminal keyboard.

BBN is seeking comments and criticisms from users of the system and gathering data to be useful in developing other applications, such as record-keeping, medical consultation, and, conceivably, protocols to guide paramedics.

THE COMPUTER CARAVAN

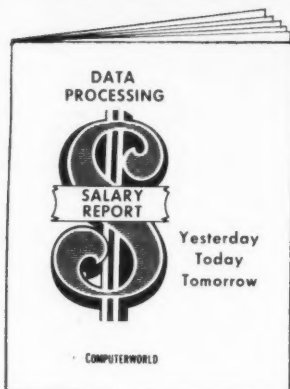
The Midwest Computer Users' Forum and Exposition Is Coming To

CHICAGO
April 18-20
Palmer House
New Exhibit Hours
1:00 p.m. — 7:30 p.m.



Sponsored by Computerworld
(617) 332-5606

DATA PROCESSING SALARY REPORT



This new and comprehensive report was prepared by our market research and editorial departments from a series of in-depth questionnaires sent to a broad range of computer users.

You'll find it a valuable source of factual information to support your management decisions and responsibilities.

Among the topics covered are:

- Salary levels by job responsibility, size of installation, and company location.

- Equipment and personnel budgets for 1969-70-71.
- DP Usage — In-house and outside.
- Changes for the 1969-71 period in salary, personnel, and equipment requirements.
- And many more facts compiled from this industry wide survey.

To get your copy of *Data Processing Salary Report*, just fill in the coupon and return it with your check for \$5.00. (Please make checks payable to Computerworld, Inc.)

Please send me _____ copy(s) of your new *Data Processing Salary Report* @ \$5.00 each. Enclosed is my check for \$_____.
Massachusetts residents add 3% Sales Tax

Mail to: _____

Address: _____

City: _____ State: _____ Zip: _____

Send coupon to:

Dept. DPSR, Computerworld, 797 Washington St., Newton, Mass. 02160

Position Announcements

JOBS JOBS JOBS

WHY IGNORE the world's largest employer of EDP personnel? Over 30,000 positions; 5000 CPU's. Information for all geographic areas. Extensive advice and specific recommendations for securing jobs with the Federal Government. Send \$4.00 to: The Washington Consultants
Department 23
P.O. Box 39094
Washington, D.C. 20016

Operations Officer for new, small Manhattan based organization. Must have:

1. Assembly language or Cobol
2. Accounting degree or equivalent.

\$12,000 to \$14,000 salary range.

CW Box 3593
60 Austin Street
Newton, Mass. 02160

OPPORTUNITIES

DIR. MKTG. — Computer Leasing, 360/370. \$40,000
DIR. MKTG. — MIL/COMM'L Data Comm. systems. \$35,000
PROJ. ENGR. — Computer based Systems, digital. \$22,000
PROG. MGR. — Telecommunications systems. \$24,000
SLS. REP. — Data Communications. NY, DC, Chicago, San Fran., Dallas, other major cities. \$20,000
SLS. REP. — Add-on 360 core memory. NY, DC, Detroit, other cities. \$20,000
APPLIC. ENGR. — Data Communications. NY, Detroit, other major cities. \$16,000
SR. ENGR. — Telecommunications products. \$16,000
JR. ENGR. — Telecommunications products. \$13,000

Call or Write now to:
BRUML ASSOCIATES, INC.
366 North Broadway
Jericho, N.Y. 11753
(516) 822-7940

Computerworld Sales Offices

Vice President — Sales
Neal Wilder

Sales Administrator:
Dorothy Travis
COMPUTERWORLD
797 Washington Street
Newton, Mass. 02160
(617) 332-5606

Northern Regional Manager
Robert Ziegel

COMPUTERWORLD
797 Washington Street
Newton, Mass. 02160
(617) 332-5606

Mid. Atlantic Regional Manager
Donald E. Fagan

COMPUTERWORLD
225 West 34th Street
Suite 1511
New York, N.Y. 10001
(212) 594-5644

Midwest

Neal Wilder
COMPUTERWORLD
Suite 218
25 East Chestnut Street
Chicago, Illinois 60611
(312) 944-5885

Los Angeles Area:

Bob Byrne
Robert Byrne & Assoc.
1541 Westwood Blvd.
Los Angeles, Calif. 90024
(213) 477-4208

San Francisco Area:

Bill Healey
Thompson/Healey Assoc.,
1111 Hearst Bldg.
San Francisco, Calif. 94103
Tel: (415) 362-8547

Japan:

Yoshi Yamamoto
Nippon Keisoku Inc.
P.O. Box 410
Central Tokyo, Japan

POSITION ANNOUNCEMENTS

HEAD OF DEPARTMENT OF COMPUTER SCIENCE and DIRECTOR OF COMPUTER CENTRE ACADIA UNIVERSITY

Acadia University requires person to teach undergraduate courses in Computer Science and act as Head of Department and Director of Computer Centre equipped with PDP-11 Computer. Preference will be given to candidates with Ph.D. degree and experience. Salary and benefits are competitive depending upon experience and training. Applicants should apply to: Dr. E.C. Smith V-President, Academic Acadia University Wolfville N.S.

We are one of Europe's leading organizations in the rapidly expanding market for used computers and brokerage. We now need

A TOP FLIGHT SALES GENERATOR

to spearhead sales efforts in a new London based venture. Reply only if you are a self-starting, ambitious man aiming for the top. Experience of IBM equipment and a general working knowledge of other systems essential.

If you are setting your sights on a salary of £ 5,000 plus with usual fringe benefits and exciting prospects for the future, apply to
CW Box 3595
60 Austin Street
Newton, Mass. 02160

Buy Sell Swap

TELETYPES AND COMMUNICATIONS EQUIPMENT BUY — SELL

Have inventory of new/used teletypes, couplers, modems and CRT's. Why wait 4-6 months to order direct from manufacturer? Why pay high rentals? All our equipment warranted as new.

We also want to buy your excess inventory of new/used teletypes or communications equipment.
Call us now at
(313) 642-2656
DATA COMMUNICATION EQUIPMENT BROKERS, INC.
17856 Birwood
Birmingham, Michigan 48009

FOR SALE

1130 8K System

FOR LEASE

360-30 65K Full System
Available — Immed.

1 Year or 2 Year

WANTED

360-20 8K or 16K
024, 026 or 029 Key punches
CMI Corporation
16225 E. Warren Avenue
Detroit, Michigan 48224

FRIDEN FLEXOWRITERS

FOR SALE 11 Model

2302s, Vintage 1968,
under Friden maint.,
3 in St. Paul, 8 in
Mtn. View. Call or
write A.K. Evans.
(415) 965-0800

TECHNICON

590 E. Middlefield Road
Mountain View, CA 94040

FOR SALE

TWO MODEL 1021 DATA TERMINALS

OPTIONS

- Serial Comm. Adaptor (1021)
- Remote Channel Select
- Remote Rewind
- Input/Output Typewriter
- Block Forming
- Card Reader

ONE UNIT AVAILABLE NOW,
ANOTHER AVAILABLE JULY 1

ONE TALLY DATA TERMINAL MODEL 1021

with Model 1021 Data Terminal
Model 1025 Data-Phone Adaptor
Model 1027A Computer Control Adaptor
AVAILABLE JULY 1

Contact R. L. Liebster

THE RUDY-PATRICK CO.
1212 WEST 8TH ST.
KANSAS CITY, MO. 64101

RP Seeds

BUY SELL SWAP

Wanted IBM 360's

All models
and components wanted.

Free Appraisal.

ABLE COMPUTER INC.
625 Bard Ave.
Staten Island, N.Y. 10310
212-273-3721

370/360

Every organization desires the best available computer equipment at the lowest cost. New systems are expensive.

Users, however, are changing equipment now because they have gained the knowledge of their requirements and understand the potential application of hardware and software. The organization that plans properly from a technical and financial standpoint will not change again in the near future.

CSA is not a manufacturer but a computer equipment leasing company. We will demonstrate how you can have the equipment which best suits your present and future needs within today's budget with significant prime and extra shift savings, and the flexibility of upgrading and early termination.

For further information, please call:

(617) 482-4671



Computer Systems of America, Inc.
79 Milk Street, Boston, Mass. 02109

BUY SELL SWAP

FOR SALE
BY OWNER

1401-B4, ser. 28000
w/1060, 1470, 2272,
3339, 3835, 4575,
5275, 5540, 7600

1402-1
1403-2
1406-1
1407-1
1311-4, s/3281
1311-2

Under IBM M/A
Avail. 60-90 days

Contact:
John A. Sfire
(313) 886-1260

WANTED:

School Payroll system to run on a 32K 360/30 equipped as follows: 1442 card read/punch, 1403 Printer, 2-2311 Disk Drives.

WANTED:

2415 - 4 Magnetic Tape Control and two (2) tapes.

CW Box 3592
60 Austin Street
Newton, Mass. 02160

FOR SALE

BY OWNER

360 MODEL 30

64K, 1.5 μ sec
Serial No. 18762
Decimal Arithmetic
Selector Channel, Console
(Can add other desired features)

Available Now

\$79,500

CW Box No. 3594
60 Austin Street
Newton, Mass. 02160

BUY SELL SWAP

FOR SALE

2401 - (3)

2403 - (1)

Model I's 9 Track
Under IBM Maintenance

Available Soon

Win Applegate
BELDING HEMINWAY
1430 Broadway
N.Y.C., N.Y. 10018
(212) 244-6040

SALE OR LEASE

UNIVAC 9300

4 TAPES
16 K MEMORY
600 lpm Printer
600 cpm Reader
200-75 cpm Punch

Contact: Larry Cox
(303) 433-6796
Box 5647
Denver, Colorado 80217

BUY-SELL-LEASE

IBM COMPUTERS
& UNIT RECORD

Wanted

IBM 360/20 System
Sell
IBM 2311 disk drives

THOMAS COMPUTER CORP.

625 N. Michigan-Suite 500
Chicago, Ill. 60611
(312) 944-1401

UCE

UNIVERSITY COMPUTER EXCHANGE



The following full systems are available for sale or lease:

CDC 6400, 6500, 6600
Univac 1107, 1108
GE 615, 635
Burroughs 5500

UNIVERSITY COMPUTER EXCHANGE

2001 Jefferson Davis Highway,
Arlington, Va. 22202

(703) 892-2500

FOR SALE

IBM 360/370 SITS

2702 Transmission Control
20 Data Set Lines
3 Local Lines

2311/2841 Disc
Telex 4822-II Tapes
800 BPI, 9 Tr., 75 IPS
Uptime Card Readers
1500 CPM

SEND FOR FREE
BUY/SELL GUIDE

617-227-8634

We Buy Any Computer
**AMERICAN USED
COMPUTER CORP.**

15 School St. Boston, Mass
02108

BUY SELL SWAP

Wanted
to Purchase

360/40 G or H
360/30 E or F

CONTINENTAL
INFORMATION
SYSTEMS CORPORATION
700 East Water Street
Syracuse, New York 13210
(315) 474-5776

Have 3000 IBM Tapes

In Plastic Cases
\$1.00 each, F.O.B.
Buffalo, New York
2400 ft. Reels
In Lots of 100.
Mail Check with Order

Saul Weinstein
361 Carmen Road
Buffalo, New York 14226
(716) 837-5397

FOR SALE

NCR 500 SERIES SYSTEM:

C-517-1 Central Processor Ser. # 7660100
C-590-1 Console Magnetic System Ser. # 7667445
C-586-1 Ledger Reader Ser. # 7908894

Other specifications:
Additional 200 record capacity
Alpha from console
Magnetic ledger

AVAILABLE IMMEDIATELY
PRICE: BEST OFFER - MUST SELL
PLEASE CALL OR WRITE:
John F. Foley (305) 525-3381
Eller & Company
Port Everglades Station
Fort Lauderdale, Florida 33316

(3) IBM 2311

Disk Drives
Ready for Shipping
For Sale OR Lease

D.P. Equipment
Marketing Corp.
260 W. Broadway, N.Y.N.Y.
Call Collect (212) 925-7737 Ext. 1



FOR SALE

360/30/40 CPU & Systems
1401, 1440 Systems
1620, 2311, 2841
All Types Unit Record

FOR LEASE

360/20, Disk System
360/30 65K CPU-Loaded

WANTED

360/20/30/40, 1403, 2311
2314, 2501, 2540, 2821
All Types Unit Record

Call or Write

Data Automation Services
4858 Cash Road
Dallas, Texas 75247
(214) 637-6570

FOR SALE

IBM

1445 MICR Printer

Write or Call:

CAC

P. Box 80572
Atlanta, Ga. 30341
(404) 458-4425

COMPUTER
SAVINGS

On IBM Computers
And Unit Record Equipment
All of Our Machines Are
Under I.B.M. Maintenance
Agreement

BUY-SELL-LEASE



DATA EQUIPMENT INC.

3306 W. Walnut Suite 304
Garland, Texas 75042
(214) 272-7581

FOR SALE - NOW

360/30 - 64K Loaded with Features

360/40 - 128K or 256K

Call us for details.



**COMPUTER
INDUSTRIES**

For The Best Buy In 360's

Dial: (312) 295-2030

Frank Sylvester

222 East Wisconsin Avenue

Lake Forest, Ill. 60045

or (404) 451-1895

Tom Williams

P.O. Box 29763

Atlanta, Ga. 30329

Sale or Lease
UNIVAC 1108 Processor

W/Fastrand II Storage Unit.

(132 Mil. Characters)

2702 Transmission Control

W/3233, 4612, 4615, 8110

(8) 2316 Disk Packs

CONTACT:

R.T. Barbour V.P.

C.I.T. Leasing Corporation

650 Madison Avenue
New York, New York 10022
(212) 572-6617

BUY-SELL-LEASE
IBM COMPUTERS - U/R EQUIPMENT

WANTED

1403/2
2501/A2 1130
IBM 1316 Packs

Econocom

DIVISION OF COOK INDUSTRIES

P.O. Box 16902

2221 DEMOCRAT ROAD

MEMPHIS, TENN. 38116

SUITE 135

PHONE (901) 396-8600

FOR SALE

402, 602, 514, 082

402 XAI (CAM)

Burroughs E6000

CONTACT:

KEN BOULDIN

JOHN FERGUSON

WANT TO BUY

360/40 CPU (H00) 256K, 2 CHANNELS, 1052
360/40 G00 (128K), 1052, 2821, 2540, 1403 N1, 2314 A01,
2803, 2X2401/4.

Write or Call:

PROMODATA
1, rue Lord-Byron
Paris 8, France

or

New York Office:
MULTIPARTS CORP.
52 Wall Street
New York, N.Y. 10005
Tel: (212) 944-4370

-WANTED-

WILL BUY OR LEASE

Fetch Protect RPQ for Mod. 50

CALL 203-359-2100

Ask for Tony

BUY SELL SWAP	BUY SELL SWAP	BUY SELL SWAP	BUY SELL SWAP	BUY SELL SWAP
 <p>DISK PACKS CARTRIDGES compatible 1316-2316-3336 System 3-2315 REFURBISHING Recertifying Repair All Work Performed In Fully Equipped Testing Laboratory Disk Packs Returned In Ten Days</p> <p>DISK PACKS CARTRIDGES PREVENTIVE MAINTENANCE INSPECTION & CLEANING WE DO NOT SELL or LEASE PACKS PRECISION METHODS INC. 30 West Washington Street Chicago, Illinois 60606 (312) 332-4355 Thomas J. Born Atlantic Research Bldg. Shirley Highway at Edsall Rd. Alexandria, Virginia 22314 (703) 354-5100 W.B. Sinclair (Bud) J.W. Constantino</p>	<p>Sale or Lease</p> <p>1401 1440 360/30 7010 360/40 7040</p> <p> Corporate Computers Inc. 420 Lexington Ave. New York, N.Y. 10017 (212) 532-1200</p>	<p>I.O.A.</p> <p>Fully Reconditioned in Our Plant. Inspected & Approved for IBM M/A. Anywhere in the United States.</p> <p>024, 026, 029, 046, 056, 059, 077, 080, 082, 083, 085, 402, 403, 407, 514, 519, 523, 548, 557, 602, 604, 632, 637, 802, 803, 826, 1060 & 1401 Systems.</p> <p>ALSO DISK DRIVES, TAPE DRIVES AND PERIPHERALS</p>	<p>360's WANTED</p> <p>IPS, one of the largest dealers in used computer equipment, wishes to buy 360 CPU's and peripherals for its own account. For a quick, firm offer, please call with specifications and delivery date.</p> <p>IPS INFORMATION PROCESSING SYSTEMS, INC. (201) 871-4200 467 Sylvan Avenue Englewood Cliffs, N.J. 07632</p>	 <p>BUYING? SELLING? Talk To GREYHOUND write Manager of Brokering Greyhound Computer Corp. Greyhound Tower Phoenix, Arizona 85007 360 Expert</p>
<p>*****</p> <p>Immediate Availability 1401-16K System 1404 I Printer 1443 II Printer 1445 MICR Printer All Types IBM Unit Record Machines</p> <p>CAC Dept. "A" - P.O. Box 29185 Atlanta, Ga. 30329 - (404) 458-4425</p>	<p>For Sale</p> <p>Under Honeywell Maintenance Honeywell H400-3K Memory Multiply-Divide Option 4-96 KD Drives 900 LPM Printer 427-1 Card Reader Punch Contact: Russell Seifert Republic Financial Service Inc. P.O. Box 3000 Dallas, Texas</p>	<p>I.O.A.</p> <p>DATA CORP. 383 Lafayette St., NYC 10003 (212) 673-9300 Ext. 10</p>	<p>WANTED TO BUY</p> <p>2821 I 2540 1403-N1 2020-CI System We'll Pay Top Prices</p> <p>Call or Write C.A.C. P.O. Box 80572 Atlanta, Georgia 30311 (404) 458-4425</p>	<p>FOR SALE or LEASE</p> <p>SEL 810A Computer with Line Printer, Disk File, Card Reader, Teletype & more. Mike Smith Santa Barbara Capital Corp. Goleta, California (805) 967-7715</p>
<p>WANTED IBM 360's</p> <p>All models and components... Prompt replies to your offerings...</p> <p>Call collect or write:</p> <p>gsm George S. McLaughlin Assoc. Inc. 785 Springfield Avenue Summit, New Jersey 07901 (201) 273-5464</p>	<p>FOR SALE</p> <p>360/20</p> <p>Card or Disk</p> <p>Write: CW Box 3538 60 Austin Street Newton, Mass. 02160</p>	<p>SALE-SALE</p> <p>1401's & 360's at Very Low Prices</p> <p>024 - \$350; 026 - \$1200; 056 - \$450; 077 - \$750; 082 - \$900; 083 - \$2700; 085 - \$2000; 402 - \$1200; 403 - \$1500; 407 - \$4300; 514 - \$1400; 519 - \$1600; 1316 Disk Packs - \$95,632; - \$700; Dura Card to Tape - \$1200; Cum- mins Carditioner - \$950; 1620 - \$10,000; 6400 - \$12,000; 1401/360s.</p> <p>ALL DATA, 105 Hinricher Willow Springs, Ill. 60480 (312) 839-5164.</p>	<p>USED EQUIPMENT FOR SALE</p> <p>AMPEX MODEL TM-7211 Synchronous Magnetic Tape Drive 7 Track Read/Write/ Erase/Heads. Special vibration isolation, long parity, 556/800 BPI, 45 IPS, used less than 4 months. IBM compatible. A steal at a fraction of its original cost. Dynamics Research (617) 658-6100 Ext. 358</p>	<p>Current Inventory SALE</p> <p>All this Unit Record Equipment in stock and ready to ship at money sav- ing sale or lease prices.</p> <p>RARELY OFFERED: 046, 029, 059, 407, A3, 548, 557, 087, 088 OTHER FINE MODELS: 024, 026, 056, 077, 085, 402, 403, 407, 514, 519, 523, 552, 602, 604, 521, 826</p> <p>... D.P. Equipment ... Marketing Corp. 260 W. Broadway, N.Y. N.Y. Call Collect (212) 925-7737 Ext. 1</p>
<p>BUY 360 SELL LEASE</p> <p>COMDISCO, INC. 2200 E. Devon Ave Des Plaines, Ill. 60018 (312) 297-3640</p>	<p>FOR SALE OR LEASE IBM 1130-8K System</p> <p>IBM Maintenance 1131-2B, 1132-1 & 1442-7 Stanley Green 625 N. Michigan Avenue Chicago, Illinois 60611 (312) 944-1401</p>	<p>we buy and sell</p> <p>IBM Computer Systems & Unit Record Machines NCR 31-32-33 Etc. Burroughs - Fridens</p> <p>marion 403 Broome Street New York, N.Y. 10013 (212) 966-5931</p>	<p>FOR SALE or LEASE H-200/20K</p> <p>INCLUDES: 4-44kb tapes, 800 cpm read, 250 cpm punch, 950 lpm print, console, paper tape reader. FEATURES: 132 print pos., punch feed read, adv. prog., edit instr., 3-stacker select, IBM tape format & code, hold count, direct transcrip- tion-read & punch, aux. r/w channel. Available as a System or by Components & Memory Mod- ules. Some Items Never Used and in Original Packing.</p>	<p>For Sale or Lease by Owner 360/65 Model I or IH</p> <p>2065 Model I or IH, two 2365-2, 2860, 2870 with two selector subchannels, 1052-7</p> <p>CONTINENTAL INFORMATION SYSTEMS CORPORATION 700 East Water Street Syracuse, New York (315) 474-5776</p>
<p>Sublease Available 360 Model 50 H (256K)</p> <p>with 2 channel, Direct Control, Console 11 Month Term, \$9500/Mo.</p> <p>Includes IBM Maint. Insurance, Transportation & Insulation. Available for Shipment Immediately Offered Exclusively Through Lunceford & Associates (913) 381-7272</p>	<p>SYSTEM 360/370 dearborn computer leasing corporation</p> <p>We Can Fill Your Computer Needs</p> <ul style="list-style-type: none"> • Buy • Sell • Lease • Subleasing <p>Member, Computer Lessors Association Dearborn Computer Leasing Corporation a subsidiary of Dearborn-Strom 4849 North Scott Street / Schiller Park, Illinois 60176 Area 312 / 671-4410</p>	<p>1401 C3 SYSTEM</p> <p>Has column binary, print stor- age, serial I/O & other features.</p> <p>729 TAPES</p> <p>Models II and IV</p> <p>1011</p> <p>Paper Tape Reader for 1401</p> <p>1005 MAG TAPE SYSTEM</p> <p>2-drives, 4K, 61 Prog. steps, dual address, 600 lpm print, 615 cpm read, 80 cc. punch.</p> <p>1004 A1</p> <p>80 cc punch Mint Condition</p> <p>360/20 CPU</p> <p>August-Sept. Delivery</p> <p>1620 SYSTEMS</p> <p>Several to choose from - Disk Available</p> <p>Select Unit Record Equipment Many Models in Stock</p> <p>COMPUTER RESALE EXCHANGE, INC. 1525 New Hampshire Ave. N.W. Washington, D.C. 20036 (202) 265-1550</p>	<p>AVAILABLE NOW FOR LEASE</p> <p>360/65J with 7044/7094 compatibility 2365's, 2860-3, 2870</p> <p>Available July 1, 1972</p> <p>UNIVAC 1108 with 196 K Core and peripherals</p> <p>CONTACT: Dave Riggs (212) 572-6615</p> <p>C.I.T. Leasing Corporation</p>	

BUY SELL SWAP	BUY SELL SWAP	TIME FOR SALE	TIME FOR SALE	SOFTWARE FOR SALE
FOR SALE 360/30 F 64K 1.5 μ s 1051-1052 Control Unit and Keyboard 2 Selector Channels Storage Protect Decimal Arithmetic 4456 Basic Compatibility Available July 15, 1972 South Carolina Electric & Gas Co. W.E. Harris, Jr. P.O. Box 764 Columbia, S.C. 29202 (803) 779-3111	AVAILABLE FOR SALE 360/50's 360/40's 360/30's ALSO Immediately Available 2365-2 CORE 2860-3 SELECTOR CHANNEL Frank Williams BOOTHE COMPUTER MARKETING, INC. 555 California St. San Francisco, Calif. 94104 (415) 989-6580	ILLINOIS IBM 360/370 USERS Computer Time Available 370/155 1024K, 3330, 2314, 2701, 4 3420's M5 & 6 2401's M6, O/S or DOS 8am-8pm 8pm-8am Weekdays RJE \$120/hr. Weekends RJE \$90/hr. 12 hr. blk. RJE \$80/hr. 370/145 256K, 3330, 2314, 10 3420's M5 (800-1600) 8am-8pm 8pm-8am Weekdays \$110/hr. \$75/hr. Weekends \$45/hr. \$40/hr. 12 hr. blk. \$40/hr. \$35/hr. 360/30 64K, 5 disk, 6 tape 8am-8pm 8pm-8am Weekdays \$50/hr. \$40/hr. Weekends \$33/hr. \$27/hr. For further information call: RON ELLIS (312) 922-6141 the computer company 141 W. Jackson Blvd. Chicago, Ill. 60604	NEW YORK ANCHOR SYSTEMS The Service Bureau That Gives a Damn! (215) 571-0905 ★ FREE ★ COMPUTER TIME All Configurations Computer Time Support (212) 972-9747 FREE COMPUTER TIME for independent programmers and program development groups. Use our computer for compiling and testing your systems In exchange, Compupower will take acceptable program packages, programming services, etc. in lieu of cash payment. Direct All Requests to: Mr. Herbert Messing Pres. Compupower Corporation (212) 239-4387 (201) 861-3900	General Ledger Accounts Receivable ***** Software Packages Tailored To Your Needs Phone DON THEE (201) 272-4350 IFA, P.O. BOX 32 CRANFORD, N.J. 07016 ACCOUNTS PAYABLE PAYROLL/PERSONNEL Modular, flexible format User-oriented control options Presently operating for a variety of users Complete, detailed documentation ARGONAUT INFORMATION SYSTEMS, INC. P.O. Box 112 Walnut Creek, California 94596 Telephone: 415-937-4675 Accounts Receivable Package For One To Eight Retail Stores Package includes edits, daily activity listings, daily reconciliations, trial balance, statements, histories. Also daily and monthly sales and accounting reports, open to buy and inventory reports. Programs are written in RPG, COBOL and PL/1. System Requirements: Two disk drives, four magnetic tape drives, 48K. Price including complete documentation \$35,000.00. For further information call (716) 297-0553 or write G.B. Computer Associates, 880 Military Road, Niagara Falls, New York 14304. Attn: George Q.A. Goldsmith.
FOR SALE 1 Digi-data Model 1720 E Convertor, Serial No. 0004 1 Digi-data Model 1437P556 Recorder 128 X 128 Record Matrex Code (Conversion) 4 Plug Boards, 2 Interconnecting Cables. Convert Paper Tape to Magnetic Tape MAKE OFFER! (215) 887-5404 or NVC COMPUTER SALES, INC. Benjamin Fox Pavilion Suite 615 Jenkintown, Penna. 19046	DATASERV equipment inc. BUY - SELL - LEASE All Model 360 Systems & Components 1401 Systems Unit Record Equipment FOR SALE OR LEASE Univac 9200 16K with 1001 Card Controller 360-40 1401 Card System 083 Sorters (\$2,800.00) All Types U/R Equip. WANTED 2020-D2 with 4442, 4460, 8090, 7495 & 4658 2415-1, 2501-A2, 1441-05 088-02 Collator Unit Record Equipment phone (612) 546 4422 300 Stelard plaza mpls. minn. 55426	IBM 360/370 USERS Computer Time Available 370/145 162K, 2314, 7-3420-M7, (9T, 800/1600 BPI), 1-3420-5 (7T, 800 BPI), 3-1403 N1 8am-6pm 6pm-8am Weekdays \$100/Hr. \$65/Hr. Weekends \$45/Hr. \$40/Hr. 6-Hr. Blk. \$40/Hr. \$35/Hr. 360/50 512K, 2314, 7-2401-M6, (9T, 800, 1600 BPI), 2-1403 N1 8am-6pm 6pm-8am Weekdays \$95/Hr. \$60/Hr. Weekends \$45/Hr. \$40/Hr. 6-Hr. Blk. \$40/Hr. \$35/Hr. 360/20 16K, 2-2415 (9T, 1600 BPI), 1-1403 N1, MFC All Shifts, All Days - \$15/Hr. - DOS Partition Time Available At Special Rates Call: Cliff Cox (312) 583-5410 GOLDEN-50 Computer Service Division 5320 North Kedzie Avenue Chicago, Illinois 60625	DATA DECISIONS INC. 370/145 360/30 ALL SHIFTS AND WEEKENDS CALL JOHN KIRKHAM (212) 582-8020	\$75 Each Buys 1130 Applications Five 1130 Application Packages. Each formerly \$3000, now \$75. You install. 75 users, superb design, all FORTRAN IV. (1) A/R bal, fwd, (2) Newspaper want-ad billing system, (3) Asset depreciation acctg, (4) General Ledger, (5) PCS-PERT-Project Control-Like IBM PCS treebe only 10X faster. For each package send \$5 for documentation only or \$75 for doc. plus source decks, which number 2000-6000 source cards. Or ask for free color brochure. PACKAGES, BOX 252, Orchard Lake, Michigan, 48033. Also, a fast (180 CPM on 60 CPS 1442) FORTRAN Source deck numbering program. \$10, prepaid.
WANTED TO BUY Used 1316 Disk Packs in good condition Call or write: R. Boni The Harper Group 545 Sansome Street San Francisco, CA 94111 (415) 392-2727	Time for Sale	MASSACHUSETTS 370/145 10 Tapes 2314 Disk O.S.-MFT Price Equivalent To A \$34/hr. 360/40, ALL SHIFTS AVAILABLE Call: Will Daugherty (617) 237-4000	Software for Sale	CATS-A/P ACCOUNTS PAYABLE CASH REQUIREMENTS 1. Multi-company Environment 2. Unique ID for Each Company 3. History File of Payments 4. Handles Manual Checks and Distribution 5. Purchase Analysis Report by Vendor CATS-A/P takes all vendor invoices received by the user and creates from them entries into the general ledger and overall job costs. This program is under control of the CATS MASTER which is provided FREE with the purchase of any of the CATS programs. Accounts Receivable, Balance Forward and Accounts Receivable-Open Item also are available.
THE HALSEY CORPORATION wants to buy 1400 7000 and 360 series computer systems tape drives and peripheral equipment. THE HALSEY CORPORATION 1367 Central Avenue Middletown, Ohio 45042 (513) 424-1697	NEW JERSEY SYSTEM/3 Time Available-All Shifts Located Near Gdn. St. Pkwy. Complete Keypunch Support All Rates Reasonable Tel. Don Thee (201) 272-4350 IFA Computer Services, Inc. Cranford, N.J.	Need IMS/360 computer time? PHI's expanded Data Center has it ready and waiting for you. With it you can • Easily convert your applications programs to IMS. • Eliminate redundant data. • Concentrate all data sets in a single data base. • Keep your programs intact during future conversions. Call or write us for details about batch and teleprocessing your IMS on our 360/65 Write for our new price list! phi COMPUTER SERVICES, INC. 800 MASSACHUSETTS AVE. ARLINGTON, MASS. 02174 • (617) 648 8550	MSA PAYROLL/PERSONNEL SYSTEM THROUGHPUT SPEED AVERAGES TWICE THAT OF OUR LEADING COMPETITOR. PAYING FOR THE SYSTEM IN A MATTER OF MONTHS! Over 100 sales in less than 2 years Tax change flexibility through use of "ALLTAX" modules Pay periods can be weekly, bi-weekly, monthly, or semi-monthly Special Report Generator included for customized reporting Documentation that exceeds the industry standard Sales and support in principal U.S. cities Comprehensive warranty 100 DEDUCTIONS 6 LEVELS OF CONTROL SALARIED AND HOURLY PAY COMMISSIONS AND SPECIAL PAY BANK SERVICES FEATURES LABOR DISTRIBUTION COMPLETE TAX REPORTING SALARY HISTORY EDUCATION PROFILE SKILLS INVENTORY PERFORMANCE RATING IBM 360 370 DOS OS ANS COBOL WRITE OR CALL CHARLES F. SIMS MARKETING MANAGEMENT SCIENCE AMERICA, INC. 1301 PEACHTREE STREET N.E. ATLANTA, GEORGIA 30309 (404) 892 3300 MSA	
NCR 400-100 Mag Stripe Ledger Accounting Machine Full Service Contract since new. Very favorable terms. Call (207) 772-5436 FOR SALE OR SUB-LEASE	360/50/40/30 1287-1288 ALL SHIFTS AND WEEKENDS Call: Roy Einreinhofer POPULAR SERVICES INC. (201) 471-2577	360/30F 65K 2 Year Lease \$2,250 net per month Decimal Arithmetic One selector channel, 1401 Compatibility 1442-N1 Sale or Lease Immediate Delivery tbi TBI Equipment Div. Time Brokers, Inc. 500 Executive Blvd. Elmsford, N.Y. 10523 (914) 592-4065 Nationwide broker/dealers of DP equipment & computer time Atlanta, Baltimore, Boston, Chicago, Elmsford, N.Y., Los Angeles, New York City, Philadelphia and Washington, D.C.	MANAGEMENT RESPONSIBILITY REPORTING. Multiple company processing. Chart of accounts independence. Installed in 5 days. ANCOM ...The Financial Systems Firm L.A. 8929 S. Sepulveda N.Y. (213) 649-1616 (212) 248-4324 Houston: (713) 464-5127 Honolulu: (808) 955-6631 Boston: (617) 332-7060 Chicago: (312) 986-1346 San Diego: (714) 235-4242 Cincinnati: (513) 961-0776	
OFF LINE PRINTING (213) 474-6576	CALIFORNIA 360/50/40/30 OFF LINE PRINTING (213) 474-6576	april IS KEYPUNCH MONTH		



**Adrian Ruyle's
committee wants
you in Boston
August 14-16.**

**For a no-tea-party
ACM 72.**

Adrian Ruyle, recently of MIT's Lincoln Laboratory and now head of ARS Training Systems, is our Northeast Regional Representative. He's no stranger to ACM annual technical conferences—having attended each one since ACM 65. Over the years, he's formed some strong opinions on how they should be run.

Now he's doing something about them. As General Chairman of ACM 72 to be held in Boston August 14-16, Adrian is helping his committee cook up a thoroughly professional program.

"It'll be no Boston 'tea party'," says Adrian. "We're cutting out the frills. ACM 72 will stand or fall on its service to our members. We want people to know what's going on in every major field of computing—and then to get more involved in their areas of interest at ACM.

"Our call for papers has produced a phenomenal response. Each Special Interest Group and Committee will showcase new developments in its own area. There will be challenges for the experts—and special tutorial

sessions for anyone who wants background on a particular topic. Overall it will be an excellent chance for members to renew or enlarge their ties with ACM. Or for non-members to join."

Plan now to join us at ACM 72. If you are not a member, part of your admission fee can be converted to annual dues—saving you \$25. Send in the coupon today!

ACM 72 Committee:
Walter Abrams
Jack Crowley
Jeffrey DeVeber
James Donohue
John Donovan
Carol Giltner
Elden Levine
Adrian Ruyle
Kenneth Scott
Rosemary Shields
Richard Waterhouse
Gunars Zagars

Association for Computing Machinery
1133 Avenue of the Americas
New York, New York 10036

I am interested in ACM and ACM 72.
Please send more information.

Name _____

Position _____

Address _____

City _____ State _____ Zip _____

acm
Association
for Computing
Machinery

COMPUTER industry

a Computerworld news section about the nation's fastest growing industry

April 12, 1972

Page 29

CI Notes

IDC Plans Bank Study

NEWTON, Mass. — International Data Corp. is planning a study of the role of the banking community in the \$1.5 billion computer services market.

IDC said banks and computer manufacturers presently are the greatest competition to the independent service companies, with the penetration of banks to increase "dramatically" over the next few years. The study will be completed this June.

SDC Reorganizes Divisions

SANTA MONICA, Calif. — System Development Corp. has announced several organizational changes and personnel assignments which will "consolidate the firm into major operating areas."

A newly created organization, the Defense and Space Division, will be headed by Dr. Donald A. Dooley, formerly vice-president of research and development. Dr. Launor F. Carter will continue as vice-president of the Public Systems Division.

James B. Skaggs has been named senior vice-president of the firm.

Tri-Data Unit Expected

MOUNTAIN VIEW, Calif. — Tri-Data is expected to announce the latest version of its Cartrifile, the Model 40 four-drive configuration.

The Cartrifile 40 uses the Tri-Data Polydrive transport mechanism and records data in the Bittrack tape format. The OEM unit price of the Cartrifile 40 is \$3,350, the computer interface costs \$600. Usual Tri-Data discount schedules apply.

Supershorts

Ampex Corp.'s Computer Products Division has established a new marketing section to specialize in sales and service of Ampex replacement equipment for computers produced by Univac. Bruce D. Stewart has been appointed Univac national accounts manager.

Tally Corp. has agreed in principle with United States Leasing, International, Inc., and the St. Paul Leasing Co. to the formation of Tally Leasing Co. which will purchase up to \$4 million worth of certain Tally equipment in 1972.

Storage Technology Corp. has landed a tape drive contract from the Social Security Administration (SSA) that could total more than \$5.5 million in sales.

Mohawk Data Sciences Corp. has agreed in principle to acquire Computing Efficiency Inc., whose subsidiary, Bucode, makes mag tape units.

Beckman Instruments, Inc. has agreed to produce high-speed card readers developed by True Data Corp. The agreement calls for production of a minimum 1,000 card readers during the first year, noted Merle Amundson, True Data president.

Microdata has shipped 1,001 models of its Micro 800 computer.

\$675 Million Seen by 1975

Point-of-Sale Field Undergoing Change

By E. Drake Lundell Jr.

Of the CW Staff

NEW YORK — The point-of-sale (POS) market is in the "throes of a complete revision in terms of the types of systems needed to perform, capture and record sales transaction data," according to Frost and Sullivan here.

Data processing will be the "key element" in the emerging POS systems, the firm said.

The present total market for point-of-sale equipment is valued at around \$400 million, Frost and Sullivan said, but annual sales should increase to \$675 million in 1975 and to \$966 million by 1980.

A total of more than \$6.8 billion will be spent on point-of-sale equipment during the 1970s, the firm said.

During that time, POS systems will change "from the cash register system to the integrated POS and credit authorization systems" working in conjunction with DP systems.

Cash registers dominate the present POS market, with a total annual sales value of \$325 million, but this will drop to \$150 million by 1975, according to the report.

By 1975, completely integrated POS systems will account for sales of \$250 million, up more than tenfold from the \$21 million spent in 1971.

Tag readers and printers valued at \$40 million will be sold in 1975, up from \$10 million today; sales of OCR journal tape readers will drop from \$20 million in 1971 to \$10 million in 1975; and credit card authorization systems, which account for sales of \$17 million last year, will grow to sales of \$180 million by 1975, the firm said.

"At present, the large department stores

are taking the initiative in implementing the new systems," the report stated, but "once their installations prove successful, which will take approximately two years, POS systems will spread to other user categories," including variety stores, small retail stores, etc.

Integrated System

"The integrated POS system will be employed by the discount and department stores, variety stores and food stores in industry and government on a complete system basis, and by the small retail stores via a POS service bureau," the firm predicted.

Presently, most potential POS users have little knowledge of the new POS systems or their capabilities, Frost and

Sullivan said, and they feel the systems are generally priced too high.

In addition, the potential users "do not understand the value of the POS system. That is, the management information systems concept has not been explained."

The major problem now is in merchandise inventory control, with salesperson errors second, the firm added. Credit card authorization is considered third in importance.

Potential users are reluctant to move to the new systems because of "system cost, anxiety over reliability and service, lack of software and economic justification," Frost and Sullivan said.

"The POS manufacturer needs to market his system with an eye toward meeting these considerations," it added.

Russia 5-Year Automation Plan Seems to Be Ahead of Schedule

By Bohdan O. Szuprowicz

Special to Computerworld

MOSCOW — Over a year has passed since the 24th Congress of the Communist Party of the Soviet Union announced directives for automation of the Soviet economy during the current five-year plan (1971-1975).

Since then, little additional information about implementation of the plans is known and the actual number of computers in the Soviet Union remains a closely guarded state secret. But some progress has been made.

Last May Mikhail Rakovsky, a deputy chairman of Gosplan, the state planning

committee, indicated that Russia will produce between 12,000 to 15,000 computers during the current five-year plan.

The results of the fulfillment of the first year in the five-year plan indicate that plans have been implemented ahead of schedule in the production of computers and means of automation, a collective term used in the Soviet Union to denote DP equipment.

The value of instruments, means of automation and computers produced during 1971 came to \$3.9 billion. This represents a 17% increase.

It is possible, then, that up to 2,000 computers were produced to meet the five-year objectives, at an average value of about \$550,000 per computer system.

Besides Riad, the IBM 360-compatible computer line, there is another line of machines in the country already in production, the ASTV series. It is exemplified by the M-1000, M-2000 and M-3000 systems, also IBM 360-compatible, and primarily designed for automation of processes and production.

It appears that the main reason Russia is embracing such intensive automation of production is a projected acute shortage of labor in the coming years.

By the end of the five-year plan every fifth industrial enterprise in the Soviet Union is expected to have an automated management and control system. In many plants automation is expected to account for 50% to 70% of all production. This undertaking is also expected to require 140,000 specialists in the design and installation of automatic systems.

The Soviets have acknowledged however, that their overall effort to develop third generation machines was lagging, although they unveiled the United Systems 1020, the smallest of the proposed Riad series.

Later, Georgi S. Pavlov, head of the Central Committee's administrative section, arrived in the U.S. to study DP techniques. Speculation among U.S. businessmen is that the Soviets, confronted with a lagging computer production and faced with ambitious automation plans, will have to turn to the West for large purchases of DP equipment.

And "IBM 360-compatible" manufacturers of CPU and peripheral equipment are beginning to turn up in Moscow in expectation of relaxation of many restrictions after President Nixon's May visit.

Insurance for Service Bureaus Protects Against Errors, Loss

SHORT HILLS, N.J. — Faced with increasing claims for errors and omissions, the service bureau industry is turning to insurance companies to protect them from losses.

At least three insurance firms offer "errors and omissions" coverage to the ser-

vice bureau industry: St. Paul Insurance Co., the Fund American Group and Chubb & Son here.

In a sample policy marketed to members of the Association of Data Processing Service Organizations (Adapso), Chubb and Son agrees to pay "sums which the insured shall become legally obligated to pay as damages by reason of claim(s) . . . arising out of negligent act, error or omission of the insured in the processing of data or records of others."

The policy would cover the actual cost of reprocessing to correct such a negligent act, error or omission and the actual income lost by others resulting directly from the error or omission.

The policy also covers the additional expenses incurred by the customer of the service bureau in maintaining his operation as nearly normal as possible after an error or omission has occurred.

The policy will also pay damages against the insured ordered by a court, but will not cover exemplary or punitive damages.

The insurance company will also defend any suit against the insured alleging the firm was negligent or made errors or omissions in its DP business up to the limit of the policy.

Excluded from the policy coverage would be libel, slander, defamation or the right to privacy suits and any dishonest, fraudulent, criminal or malicious act, error or omission.

Two Software Groups Unite in Legal Fight For Program Patents

McLEAN, Va. — The Association of Independent Software Companies (AISC) and the Software Section of the Association of Data Processing Service Organizations (Adapso) have retained counsel to file a joint brief in the Supreme Court in support of patents for software inventions.

Martin Goetz of Applied Data Research and Larry Welke of International Computer Programs, spokesmen for AISC and Adapso, respectively, explained that the Supreme Court, in response to the petition of IBM and other hardware manufacturers, has decided to hear the appeal of *Benson and Tabbott*. In this case, the Court of Customs and Patent Appeals reversed a U.S. Patent Office decision and ordered the grant of a patent for a code converter (from binary coded decimal to binary) based on software techniques.

New Plasma Digivue Displays Graphics, Signatures

TOLEDO, Ohio — Owens-Illinois, Inc. has announced a new Digivue product, the model 80-33 display unit, capable of displaying illuminated letters, numbers, graphs or hand-written signatures, according to the company.

The new unit has a matrix of

New OEM Products

80 by 256 lines and a resolution of 33 line/in. It includes the display panel and associated drive and sustaining circuitry.

Approximately 1,400 5 by 7 dot characters can be written each second in serial address. For faster data rates, units using parallel addressing can write 10,000 char./sec.

PDP-15 Memory Out

WALTHAM, Mass. — Dimensional Systems, Inc.'s new low-cost add-on core memory system for the PDP-15 computer, the DMS-15, operates with an 800 nsec cycle time and is available with room for 16K or 64K of 18-bit memory.

Eighteen bits of address are recognized by the unit allowing indexed registering to 128K of core. A boundary register locates the add-on memory above the main memory in core space.

The memory system is composed of two standard rack chassis. A typical 32K block sells for less than \$25,000 installed.

Other New Products

A portable card punch for use in source data entry applications is being made available for OEM purchase by Data Devices, Inc., Tarzana, Calif.

The Micropunch 461 simultaneously punches and interprets up to eight columns of numerics on a standard 80-column tab card.

The portable punch retails for \$395. Delivery is 30 days.

A miniaturized scan converter, designed for video data processing in information display applications, has been introduced by Hughes Aircraft Co.'s Industrial Products Division, Oceanside, Calif.

Ramtek Corp., Palo Alto, Calif., announced an off-the-shelf grey scale raster scan graphic display system. The GX-100 with an all solid state memory will allow selectable grey scale from two shades to 16 shades at no additional cost to the basic system, Ramtek said.

The price for systems with four shades of grey is \$7,500; eight shades for \$8,500; and 16 shades for \$9,500.

Two new 4-word by 8-bit ran-

dom access NDRO memories using COS/MOS technology have been introduced by RCA, Somerville, N.J., for new equipment designs.

Standard Microsystems, Mountain View, Calif., has introduced a high-speed MOS Universal Asynchronous Receiver Transmitter (U-ART) subsystem. The Standard U-ART has a 200 nsec strobe rate and 20 kbaud rate.

There can be 5, 6, 7 or 8 data bits, odd/even or no parity, and 1 or 2 stop bits and it can

operate in either the full or half duplex mode.

Esterline Angus Division, Indianapolis, Ind., of the Esterline Corp. has announced a pair of digital data acquisition systems that collect analog data from 100 or 200 channels, convert the signal to computer-compatible form and can be set for a wide range of data print rates.

Burroughs Corp.'s Electronic Components Division, Plainfield,

N.J., offers a standard product line of single-row 80-character position Self-Scan panel displays.

Computer output can now be printed noiselessly on ordinary paper with the DI-240 magnetic printer from Data Interface, Danbury, Conn.

The printer is compatible with TTL logic or RS-232. Production units will be available in July.

The Model 6 label printer from

Computer Terminal Systems, Inc., Plainview, N.Y. employs the print mechanism of the CTS Model 4 Strip Printer and features both a micro-well ink roller and guillotine mechanism.

Potter Instrument Co., Inc., Melville, N.Y., has a militarized airborne version of its matrix printer, the HSP 3609.

The printer, which meets the environmental requirements of MIL - T - 21200, MIL - E - 5400 and MIL - E - 16400, is also in use in the F15 program.



Twice again, we've made

Our PDP-11 Disk Operating System (DOS-11) now goes for around 22% less.

And all other PDP-11 systems are way down, too.

Which undoubtedly comes as good news for anyone who hasn't been able to afford one before.

But it's good news for people who buy quantity, too.

These prices are down simply because we've started manufacturing two new, lower-cost PDP-11 products.

A new DECpack moving head disk. The RK05. With 2.4 million bytes per disk. Up to 8 disks per controller. Fully compatible with the PDP-11.

But for 37% less than the DECpack it replaces.

And a new DEC memory system. In 8K increments. To 24K. With its own box and power supply. And faster than the system it replaces.

But 36% less.

And that's before quantity discounts. Both the RK05 DECpack and DEC memory are ready for delivery now.

CRASH

You can prevent Head Crash with System 316
SEND FOR COMPLETE DETAILS.
The TEXWIPE Company
Box 278-A
HILLSDALE, NEW JERSEY 07642

U.S. Confirms Import Rise

WASHINGTON, D.C. — U.S. exports of business machines in 1971 totaled \$1.6 billion, the same as the previous year. Imports, however, gained 12%, from \$506 million to \$564 million, the U.S. Department of Commerce reported recently.

Computers, peripheral equipment and parts accounted for the largest segment of 1971 exports, 68%, for a total of \$1.1 billion, the same as in 1970. Of the total, computers comprised \$374 million, parts \$323 million and input/output peripheral devices \$250 million. Major customers included West Germany, the UK, France, Canada and Japan.

Statistical machines used with punched card or tape shared 8% of exports at \$136 million. The leading customers were Canada, France, the UK, Japan and West Germany.

Data processing machines, including punched card machines, tape readers, tape punches, card readers and other DP machines totaled \$92 million or 16% of imports in 1971, increasing 114% from 1970. Canada was the principal supplier.

Study Says Remote Computing Market To Double, Warns of Public Backlash

NEW YORK — The computer's tendency in the public mind to depersonalize human relations and to perform "people-processing" functions threatens a consumer backlash that could eventually surround the computer industry with legislation and controls, Frost and Sullivan said here recently.

In a report on "Remote Computing," the firm forecasts hefty growth for those markets that utilize remote computer services and equipment.

Specifically, total revenues are projected to climb from \$1 billion in 1972 to \$2 billion in 1975 and to \$4 billion in 1985.

The figures assume the industry can ward off any restrictive public reaction, which, the report warns, is a very real, although an unrecognized danger, arising from the way in which some computer systems are being deployed to control decisions, such as those affecting credit and employment chances.

The study concludes that re-

remote computing markets can be expected to grow by at least 15% over the next five years, which contrasts with a 10% growth rate for the computer industry as a whole.

Telephone Troubles

More than 75% of the users surveyed had experienced trouble with the communication lines provided by telephone companies for data transmission, the report finds. The main problems are "noisy lines" and the fact of having to "deal with the telephone company."

Whether such problems would be relieved by the new data communications services to be provided by the specialized common carriers, however, is not now known. Many users were uncertain as to how their use of remote computing would be affected by this development, the report says.

Orders & Installations

The first installations of NCR Century 300 computers are under way. Two Century 300 systems are currently being installed in the headquarters of the Sumitomo Bank in Osaka, Japan. The Osaka installation represents half of Sumitomo's order for four of the large systems.

First U.S. deliveries will be to the office of the Texas Secretary of State, Austin, and The First Security National Bank of Beaumont, Texas.

Coutts and Company, a London-based banking concern, has installed a Univac 9400 with 33 Univac DCT-1000 Data Communication Terminals as the first step in the establishment of a real-time banking system.

Standard Oil Co., Ohio, has leased an ECM-65 extended core memory from Ampex Corp.

Long Island Lighting Co. has ordered an information processing system from Sanders Associates, Inc., comprised of about 200 terminals.

Berrien County Milk Producers Inc., Benton Harbor, Mich., has installed a Burroughs B2500 for route settlement, production and inventory control, cost accounting, payroll and other accounting purposes.

The Los Alamos Scientific Laboratory of the University of California has installed an Information International FR 80 Computer Output Microfilm (COM) recorder at Los Alamos.



more PDP-11 cost less.

So now you can come to Digital for your entire system.

Now you won't have to go through the hassle of working with several suppliers.

Or design special interfacing hardware.

Or write interfacing software.

Because, twice again, we've made more PDP-11 cost less.

Write. Or call.

Digital Equipment Corporation,
146 Main St., Maynard, Mass. 01754.
(617) 897-5111.

European headquarters:

81, route de l'Aire, 1211 Geneva 26.
Telephone 42 76 50.

ATTENTION: Members of the Digital Equipment Users Society:
SPRING SYMPOSIUM MAY 11-13, Parker House — Boston, Mass.

digital

Micro Cartridges



Operate in the Microfilm Reader 3M — MicroReader — Dietzen — Microscan — Ednalite — Northstar. Hold 100 ft. of 16 mm film, and equipped with leaders & trailers. Guaranteed as to durability and mechanical efficiency.

95¢

Write for literature — prices.

MICROFILM PRODUCTS, INC.
Division of Equity Enterprises, Inc.

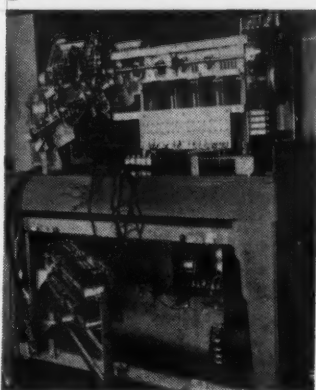
Concept 'Gains Acceptance'

Reconditioning Is a Thorough Process

ATLANTA — "Used equipment may have been under maintenance, but we feel reconditioning is an important element in quality equipment," noted Ralph Graves of TLW.

TLW sells and leases reconditioned equipment, from unit record and keypunches to IBM 360/50 mainframes and peripherals. Computer Acquisitions, a TLW division, acquires and acts as a broker of used equipment.

Thus, while other firms act as brokers of used equipment, and



077 collator has been cleaned, and is waiting to be painted and reconditioned.

ment is more reliable. Sometimes it's hard to explain to a prospective user that the equipment, although under maintenance, hasn't necessarily received preventive maintenance and upkeep," he continued. "But the concept of reconditioned equipment is being ac-



Hand-cleaning these 402 counters is a week's work for one man.

cepted by an increasing number of users."

In addition to reconditioning machines, TLW also will make customer-requested modifications.

During the reconditioning process, TLW cleans each machine, many parts by hand, paints the frame, spots and replaces frayed wires, loose connections and other potential sources of malfunctions, reassembles and checks out the machine.

Most of TLW's business involves IBM equipment, because



Eddie Cook cuts and strips wires.

"that's what's out in the marketplace."

"Although most people think of us as handling keypunch machines, we can handle up through a 360/50," Graves added. The firm currently has a quantity of disk and tape drives in stock, as well as a 360/30 and 40.

CW Photo Feature
By Molly Upton



Bob Allen runs diagnostics on a 360/40.



056 verifier being reconditioned undergoes thorough cleaning with sprayed solvents, after parts requiring manual cleaning have been removed.

still others will recondition machines, TLW can handle the whole process, acquiring the desired machine and reconditioning it, and then selling or leasing it to the user.

More Reliable

"We feel reconditioned equip-

THE COMPUTER CARAVAN

The Midwest Computer Users' Forum and Exposition Is Coming To

CHICAGO
April 18-20
Palmer House

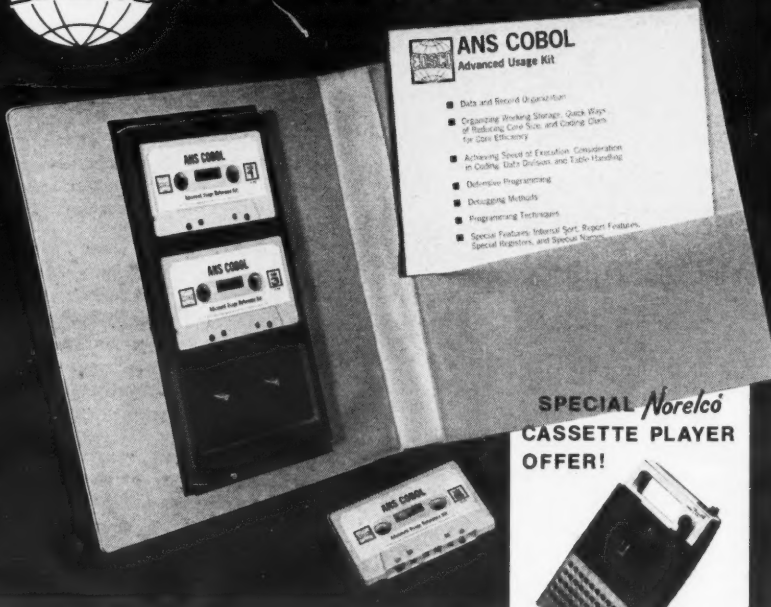


Sponsored by Computerworld
(617) 332-5606

ANS COBOL Advanced Usage Kit



The most important aid since the introduction of ANS COBOL... and a must for today's professional programmer!



SPECIALLY PRICED... \$25 complete kit. only

This modularized kit assumes that the user is familiar with either COBOL or ANS COBOL. It consists of three (1 hr.) standard audio cassettes, cross-referenced to an illustrated workbook that lets you learn at your own speed. Cross-referencing permits selective access, providing an invaluable desk reference for programming in ANS COBOL. Specific reference is made to IBM's OS and DOS systems, but all programmers will benefit, no matter which manufacturer's equipment is in use.

- ANS COBOL Advanced Usage Kit**
- Data and Record Organization
 - Organizing Working Storage: Quick Steps of Initializing Core Size and Coding Data for Data Efficiency
 - Achieving Speed of Execution: Considerations in Coding, Data Division and Table Handling
 - Database Programming
 - Debugging Methods
 - Programming Techniques
 - Special Features: Internal Sort, Debug Features, Special Operations, and Special Naming

SPECIAL Norelco CASSETTE PLAYER OFFER!



with kit
\$19.95

Reg. \$29.95 retail value

New Model 1100—fast forward/rewind—earphone jack

Purchases of less than 10 kits must be prepaid. Purchases of 10 or more kits may be invoiced if accompanied by purchase order.

Quantity prices to corporations, business schools and universities. Tax deductible.



EDSCO Management & Technical Education Inc. 270 North Avenue, New Rochelle, NY 10801

Do you call on computer users?

Sell
POWERGUARD

...and
increase
your
profits



Since you are already calling on computer users, PowerGuard may be just the thing to increase your product sales. PowerGuard monitors power lines for momentary power fluctuations which can cause the computer to generate and print erroneous data. It sounds a warning when a power transient does occur and permanently records and displays its amplitude, duration and time of occurrence. PowerGuard is

completely automatic and simply plugs into the same power outlet as the data processing system. It sells for only \$1,175. Data Research Corp. is now increasing its marketing representation on a nationwide basis. Hundreds of these PowerGuard units are now saving money for computer users throughout the country. If you are interested in adding PowerGuard to your product line, please call (305) 563-8885 for further information.



DATA RESEARCH CORPORATION
2601 E. OAKLAND PARK BOULEVARD, FORT LAUDERDALE, FLA. 33306

IBM Group Would End Layoffs

SAN JOSE, Calif. — Employees at IBM's disk facility here are organizing to prevent "the termination and layoff of IBMers," according to a statement of the IBM Norcal Employees Association.

Layoff of employees is presently being accomplished through the use of the "notice list," pretext firings and "tightening up" of the appraisal system, according to the recently organized group.

"An employee with over 20 years in IBM was recently terminated while others have been forced to resign. Our group will end this disgrace," the association said.

Other demands of the group include the establishment of a mandatory cost-of-living increase on an annual basis. "The current

'merit' system is at best a sad joke and it does not permit the employee to even maintain his current standard of living," the group said in a recent handout to employees at the facility here.

'Normal Severance'

The group also wants to "assure that employees who voluntarily leave IBM receive at least normal severance... Currently an employee who voluntarily resigns leaves with empty pockets."

The group also urges the establishment of company-paid dental and legal care plans for IBM employees and the establishment of "totally new grievance procedures as a viable substitute to the 'open door.'"

The group also demands three

weeks' vacation for employees with less than five years with the firm and a similar adjustment for employees with more than five years.

Furthermore, the association seeks a four-day week and a revision in the major medical benefits of the firm.

Labor Backing

The association claims that the present medical benefits "bureaucracy" currently has 847 unprocessed benefits claims.

"We seek a decentralized arrangement whereby your manager's signature on the application brings the money in your check the following Monday," the group stated.

The group also claims to have the backing of organized labor.

NCR CENTURY USERS

Is there an I/O Writer on your Century?

If so, you can use Q-Data's new programming language, BASIC-I. BASIC-1 can be learned in a few hours and is an ideal supplement to the NCR languages you are now using.

BASIC-1 runs on any Century 50, 100, or 200 and has all — and even more — of the features of Dartmouth's BASIC.

BASIC-1 also comes in two On-Line versions:

- Dedicated (16K, handles 15 remote terminals simultaneously)
- Dual Programming (32K, handles 10 terminals, foreground and background program simultaneously)

All versions are proven packages, installed internationally with complete documentation and maintenance.

BASIC-1 is also available on a FREE 30 day trial basis without any obligation to you.

We're keeping our marketing costs low so no salesman will call. As a result, the product cost is also low.

For more information, write to:



Q-Data Corporation
4327 West Broadway
Hawthorne, Ca. 90250
(213) 644-5551

Transportation Dept. Awards \$3 Million In Software Contracts

WASHINGTON, D.C. — The Department of Transportation has awarded three contracts totaling \$3 million for computer software for planning urban mass transit systems as part of a \$3.1 billion program to upgrade mass transit in the U.S.

Planning Research Corp. won a \$1 million pact to improve computer techniques currently used in transportation planning, and Peat, Marwick, Mitchell and Co. got a \$900,000 contract to devise new computer techniques for transportation planning.

The third contract, valued at \$1.1 mil-

Contracts

lion, goes to TRW Systems Group to design and document full-scale pilot tests of all of the programs of the two other contractors.

Other Contracts

Bresnahan Data Center has received a three-year systems management contract from Golconda Corp., manufacturer of gas control devices, food service equipment and precision components for industries.

Pentamotion Enterprises, Inc. has been selected to manage and operate the Middle Atlantic Educational and Research Center (Merc), a regional DP center for nonprofit agencies, located at Franklin and Marshall College.

Computing and Software, Inc. has received contracts from eight Southern California consumer credit reporting agencies for its Medallion service, which links the company's central credit information file with those of outlying credit bureaus.

Inter-Continental Computing, Inc. will provide computerized on-line accounting services for three years to the Missouri Pacific Employees Credit Union.

Arthur Andersen & Co. has received a contract from the Department of Transportation for development of a data system designed to improve economic analyses of transit companies' financial and operating problems.

Accounting Controls Corp. has signed a long-term facilities management contract with Doehla Greeting Cards, Inc.

Bunker Ramo Corp. has received a contract for a multi-station BR-700 information system from the U.S. Navy. The system will be used by watch officers in reviewing and validating reports.

DUO 360/370 shrinks OS manpower conversion costs up to 90%.

Going from DOS to OS is a battle. For one thing, programmer man-hours are monstrously inflated by the need to reprogram everything from DOS. With DUO 360/370 you get OS results without reprogramming.

For another, OS test time is an obstacle. DUO cuts it by as much as 90%.

And in the conversion, departmental morale suffers heavily. DUO removes the pressure, by removing the need to reprogram everything at once.

What is DUO 360/370? Some kind of knight in shining armor?

If you're captured in the OS conversion process, it is. Because DUO permits most DOS object programs to fully access OS facilities without reprogramming. Your DOS supervisor is not needed. And that makes DUO unique in

the marketplace.

It's been in operation at blue chip companies across the nation for over a year now. Try DUO 360/370 free, on your own computer, and prove it for yourself. Simply call me, Jack Keen, Director of Special Products, (214) 637-5010, or write.

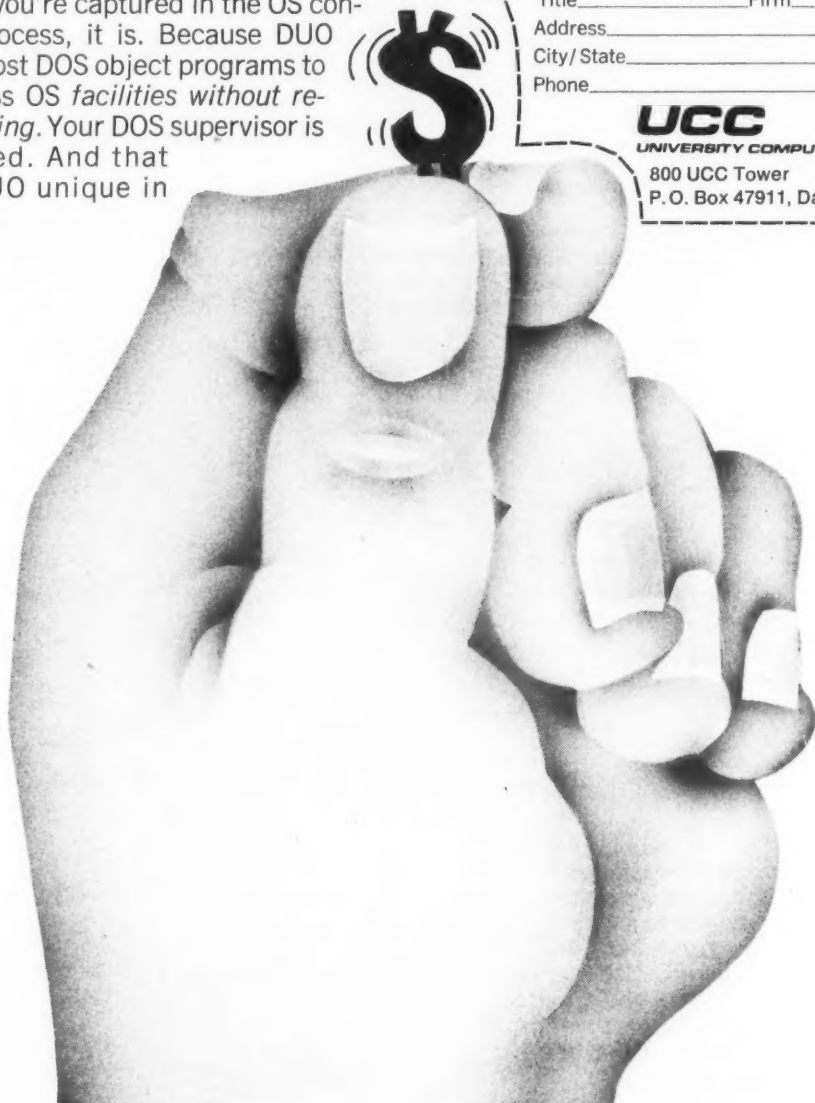
Gentlemen: I'm interested in a free trial of DUO 360/370 on my equipment.

- ☐ send me more information
☐ have someone call to set up my test

Name _____
Title _____ Firm _____
Address _____
City/State _____ Zip _____
Phone _____

UCC

UNIVERSITY COMPUTING COMPANY
800 UCC Tower
P.O. Box 47911, Dallas, Tex. 75247



City _____ State _____ Zip _____



TRADE QUOTES

Computerworld Stock Trading Summary

All statistics
compiled, computed
and formatted by
TRADE★QUOTES, INC.
Cambridge, Mass. 02139

Earnings Reports

DEARBORN-STORM

Three Months Ended Jan. 31

	1972	1971
Shr Ernd	\$.40	a\$.31
Revenue	10,575,000	9,056,000
Earnings	1,065,000	882,000

a-Adjusted for a 100% stock distribution in November 1971.

FABRI-TEK

Three Months Ended Dec. 31

	1971	a1970
Revenue	\$4,075,901	\$4,091,477
Spec Cred	b133,358	c32,470
Loss	629,030	1,318,956
9 Mo Rev	12,117,714	14,163,165
Spec Cred	b2,045,973	c32,470
Earnings		
(Loss)	e412,300	(2,007,065)

a-Restated to reflect operations of Fabri-Tek Micro-Systems Inc., not previously consolidated. b-Consists of gains on purchase of debentures and sale of Fabri-Tek Micro-Systems, Inc. in the third quarter, and gain on sale of Nicolet Instrument Corp. in the nine months. c-Reflects \$216,199 gain on purchase of debentures, less \$183,729 charge-off of discontinued operations. e-Equal to 13 cents a share.

SANGAMO ELECTRIC

SANGAMO ELECTRIC
Year Ended Dec. 31

	1971	1970
Shr Ernd	a\$3.34	\$.64
Revenue	82,462,000	83,973,000
Loss Disc		
Op	1,715,000	1,250,000
Spec Chg	b1,685,000
Earnings		
(Loss)	(771,000)	1,751,000

a-Based on income before special charge. b-From sale of the Transitel Computer Support Systems Division, the related write-offs of certain assets and satisfaction of commitments.

STANDARD REGISTER

Year Ended Jan. 2

	1972	1971
Shr Ernd	\$.82	\$ 1.82
Revenue	107,139,349	102,119,558
Earnings	1,759,944	3,912,400
3 Mo Shr	.32	.49
Revenue	26,534,899	25,385,804
Earnings	683,685	1,059,297

a-Restated.

GENERAL AUTOMATION

GENERAL AUTOMATION

Three Months Ended Jan. 31

	1972	1971
Shr Ernd	a\$12	\$06
Revenue	3,631,000	2,985,000
Spec Cred	b197,000
Earnings	c402,000	103,000
6 Mo Shr	a.18
Revenue	6,508,000	5,335,000
Spec Cred	b302,000

Earnings		
(Loss)	c611,000	(70,000)

a-Based on income before special credit.
b-From tax loss carryforward.
c-Equal to 23 cents a share in the quarter and 36 cents a share in the six months.

PHOTON

PROTON
Year Ended Dec. 31

	1971	1970
Shr Ernd	b\$.20
Revenue	22,054,001	\$19,721,629
cSpec Cred	465,209	763,774
Earnings (Loss)	e1,349,468	(978,464)

a-Restated to include Bridge Data Products Co. on a pooling-of-interests basis. b-Based on income before special credit. c-From settlement of patent suit in both years and tax credit from loss carryforward in 1971. e-Equal to 31 cents a share.

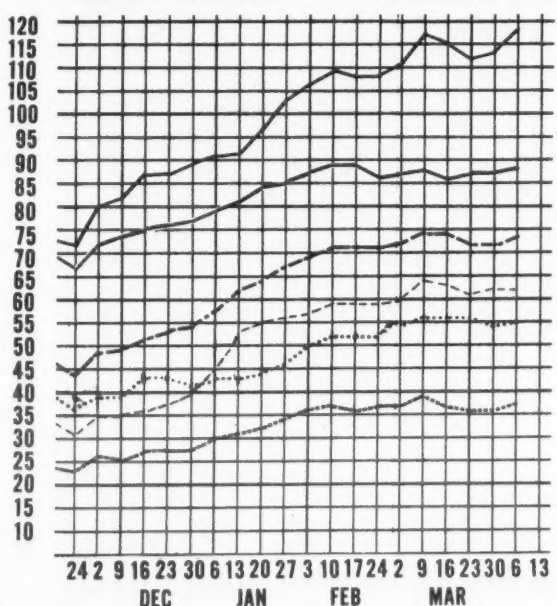
FOXBORO

Year Ended Dec. 31

	1971	1970
Shr Ernd	\$1.52	\$1.31
Revenue	157,995,810	144,989,662
Earnings	6,734,183	5,486,870
3 Mo Shr	.39	.56
Revenue	39,613,000	39,438,000
Earnings	1,744,000	2,325,000

Computer Stocks Trading Index

———— Computer Systems	----- Software & EDP Services
----- Peripherals & Subsytems Leasing Companies
———— Supplies & Accessories	----- CW Composite Index



SUPPLIES & ACCESSORIES

N	ADAMS-MILLIS CORP	9- 19	10 1/8	- 1/4	-2.4
A	BALTIMORE BUS FORMS	6-10	6 1/4	+ 1/2	+8.6
O	BARRY WRIGHT	7- 13	12 3/4	+1 5/8	+14.6
A	DATA DOCUMENTS	14-29	23 1/4	+1 1/2	+6.8
O	DUPLEX PRODUCTS INC	8- 16	14 3/4	- 1/2	-3.2
N	ENNIS BUS. FORMS	5- 13	8 3/4	+ 3/4	+9.3
O	GRAHAM MAGNETICS	9- 35	21 1/2	- 7/8	-5.9

EXCH: N=NEW YORK EXCHANGE; A=AMERICAN EXCHANGE
L=NATIONAL EXCHANGE; O=OVER-THE-COUNTER
P=PHIL-BALT-WASH
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR



Unquestionably the best software value on the market today!

EDOS

EDOS is...

■ Six Partitions ■ Automatic Load Balancing ■ Relocatable Loader ■ Blocked Fetch ■ Resident Transients ■ F-Level Linkage Editor ■ Automatic Volume Sensing ■ Procedure Libraries ■ Job Accounting Extensions ■ F-Level Volume Dump/Restore ■ Source Library Extensions ■ Text Editor

EDOS IS...

EDOS was developed by The Computer Company to improve the performance and operational characteristics of the IBM Disk Operating System (DOS) on your System/360 or System/370. EDOS is the new support for the DOS user. EDOS is a continuing series of system releases offering coordinated enhancements to DOS. Through this, and future releases of EDOS, the current DOS user is provided both continuing support and the development of additional integrated enhancements. EDOS is, therefore, the Extended Disk Operating System. However, it is more; it is in many cases a logical alternative to OS. EDOS is modular. Each feature of EDOS is optional, minimizing the storage requirements of EDOS for each installation. The resident additional storage requirement for most installations is less than 2K.

COMPATIBILITY!

EDOS is 100% compatible with DOS. All IBM distributed programs and all user written programs will operate under EDOS without modification. No modification to the programs, job control language, or data files is required. Programs do not need to be recompiled. Problem programs can be run under the control of EDOS and then be immediately run under DOS control, if you desire. EDOS benefits are universal, from the 32K DOS system to the larger users who may be considering a DOS to OS conversion. EDOS is extremely easy to install since no changes are required to your current operation.

PERFORMANCE!

EDOS is performance. The primary purpose of EDOS is to improve the throughput of your current system. This is accomplished by providing:

1. Additional new features to allow optimum use of your hardware configuration.
2. An improved operating environment for your system operators.
3. Enhanced functional characteristics of existing features.

Some installations have realized overall throughput improvements of 25% with EDOS. Equally important are the EDOS features, like six partition support, that provide new application opportunities.

INEXPENSIVE!

EDOS is inexpensive. With all of the features and performance that EDOS provides, its compatibility and ease of installation, we believe you will want to evaluate it in your own installation. We frankly believe you will agree that EDOS is the most exciting systems software available. A 60 day free evaluation period is provided. The basic System Release 4 of EDOS (all features except six partition support) has a lease price of \$225.00 per month. The full System Release 4 of EDOS (including six partition support) has a lease price of \$300.00 per month.



Systems Software Specialists
THE COMPUTER COMPANY
7th & Franklin Building • Richmond, Va. 23219 • 648-5823

The Computer Company
7th & Franklin Bldg.
Richmond, Va. 23219

Please send me additional information about EDOS.

NAME _____

TITLE _____

COMPANY _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____